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No. 3001

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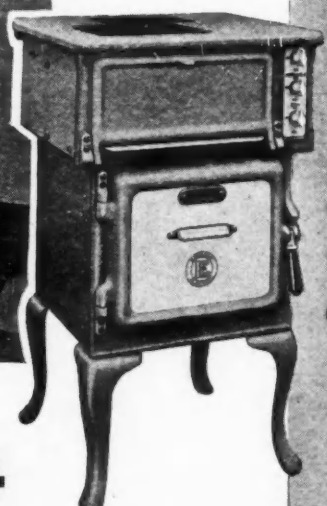

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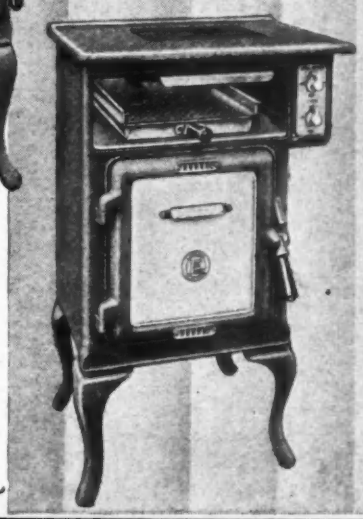

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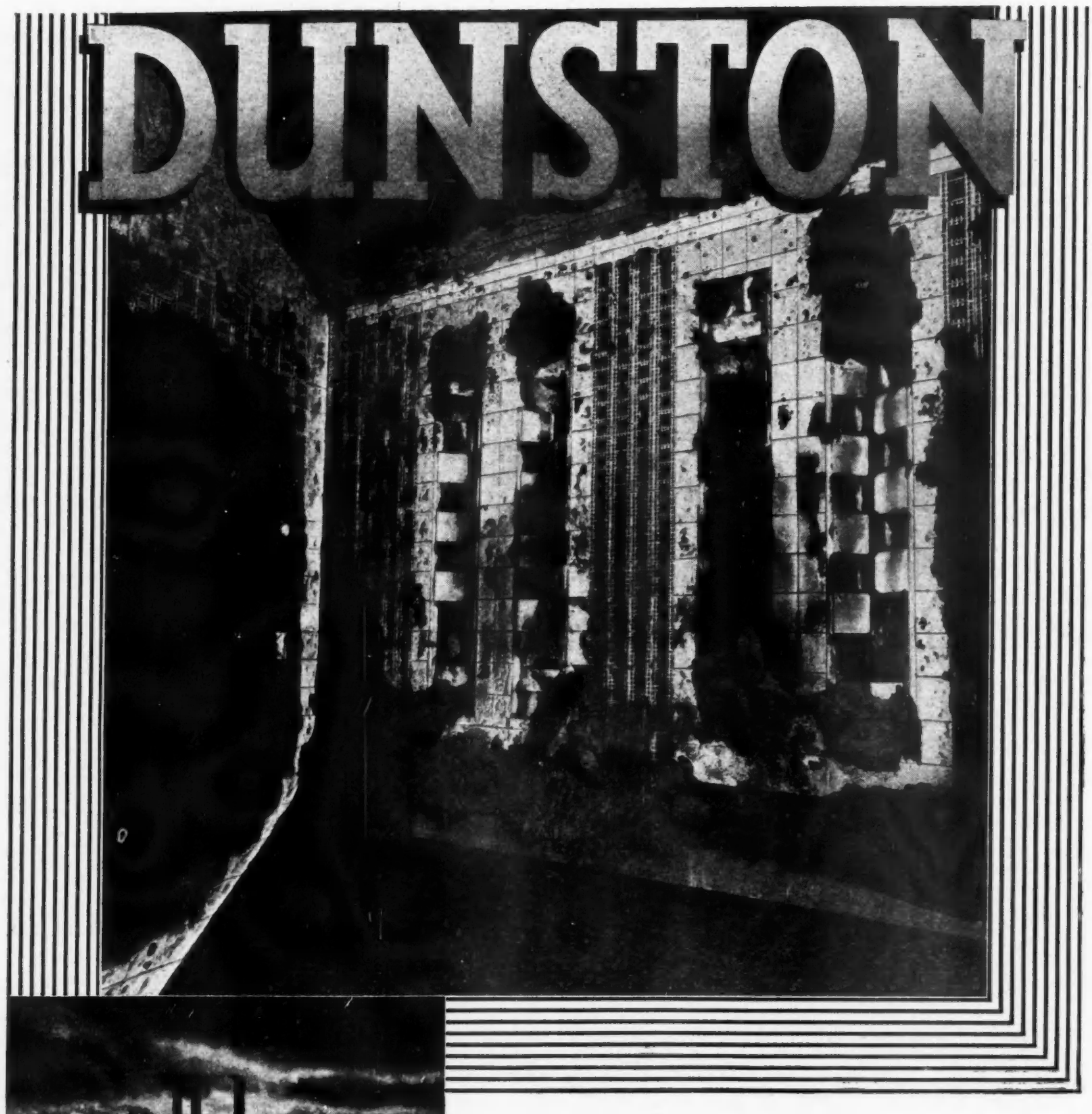

82 B. & W. Boilers have been supplied for the major stations of the North-Eastern Electric Supply Co. Ltd., giving a total normal capacity of nearly 4,000,000 lbs. of steam per hour.

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The upper illustration shows the interior of the Bailey Furnace on one of the pulverised fuel fired boilers, which is equipped with Calumet burners.

The illustration on the left gives an impression of the station as seen from the North bank of the River Tyne.

Our Reprint No. 1173 of a technical paper article describing this installation will be sent on request.

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The
Electrical Review

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Co-operation at Bournemouth

TO-DAY the British Industries Fair closes its doors and the centre of electrical interest changes over to Bournemouth where preparations are well advanced for the opening on Monday of the first National Electrical Convention.

If in future the National Convention is to be a regular event, and the Fair at Birmingham is to take place in May, a longer period will, we are sure, be allowed to elapse between them than has been found possible this year.

Nothing was more natural than for difficulty to arise and criticism be offered this year seeing that we have been making two important experiments. We believe, however, that most of the criticisms or suggestions that have reached our ears have been made in the interests of the entire industry. Both events directly concern the whole electrical industry, and, that being so, every effort should be made to secure that all interests shall work together in making plans for the future. No matter how many times the different sections have failed to come to working trade and other agreements in affairs of detail, here there seems to be a simple straightforward question upon which common policy and united action should be possible.

We are hoping, however, that, either during the Convention or shortly after, it will be found possible to reach agreement concerning questions far more important than mere matters of date.

Whether it is reasonable to expect such great things as some look for from the first united gathering of its kind, we shall soon know. If all round there is a spirit of give-and-take and a willingness to subordinate self-interests to the common electrical good, there will be an atmosphere in which almost anything may happen. But aspirations we have had long enough—what we want now is the laying of the foundations of a new order, and it is only if the leaders of the various sections meet, with prepared proposals more acceptable and workable than those of the past, that we shall leave behind us the period of mere words, aspirations, and friendly gestures, and shall reach resolves which will take practical shape in measures which will expedite sound united electrical development.

During recent months the I.M.E.A. has been taking a close interest in the "Fair Trading Policy" which has been before the industry for some time and it is more than possible that during the holding of the Bournemouth Convention, ways may be found for its attitude toward that policy to be carried to a more advanced stage.

As Mr. J. N. Waite points out in his article on page 778, a recognised weakness of the situation as affecting co-operation lies in the absence of any single body to represent any one of the several groups concerned with the adoption of a national policy. Without a national policy adopted by all the various parties making up the several individual sections, enforced observance on a large scale of any agreement is an impossibility.

There will, in Mr. Waite's view, be faster progress of electricity supply if we can effect rationalisation of sectional relationships on such a national basis. Many of our counsellors hold the same view but some still see the lions in the path.

It is obvious that no Trading Policy can be successful unless it has the strong approval and backing of electricity supply interests, both municipal and company. If such can be secured, the way will be cleared as Mr. Waite suggests for a real co-operative meeting of the parties to be held soon after the Convention under the aegis of the Fair Trading Council.

After very many years of conferences, talks, and discussions then, we meet at Bournemouth in 1935 still confronted in the electrical industry, as in international affairs, with the problems of co-operation and peace. We may add, however, that it is because so many minds are at work, eager to find a way out, that we look forward to next week's proceedings with, perhaps, more hope than usual, though, of course, we feel that those who anticipate that the holding of a National Convention means an end to all differences are of all men the most incorrigible optimists.

Standard Street Lighting

ILLUMINATION of the 120 miles of streets in Norwich is to be brought up to the requirements of the appropriate British Standard Specification. Discharge lamps will be used in the main streets, subject to further trial in the shopping centres, but Mr. V. A. Pask, the city electrical engineer, anticipates no serious objection to their use there, as the high lighting intensities with tungsten lamps in the shop windows prevent noticeable alteration in colour values. The addition to the total annual cost of public lighting after allowing for a reduction in price from 0.9d. to 0.625d. per kWh and increasing the number of standards by one-seventh and the wattage by nearly two-thirds will be under 1½d. in the £, making the total rate 5.12d. in the £. This, we believe, is still below the average for our principal cities, although the general standard of lighting should be appreciably better. There is probably no B.S.S. that has received so little practical recognition in relation to its deserts as the one in question. So far as we are aware, Norwich is the first town of its size to adopt the standard classification throughout its area.

Flexible Connections

FATALITIES due to electricity form so small a proportion of the total for all causes as to be statistically almost negligible, and their recurrence can be prevented if we profit by experience in each instance. The undesirability of using long twin twisted flexible cords for connecting portable apparatus is illustrated by a case at Ealing in which a fatality occurred. A woman on getting out of bed in the morning picked up a table lamp, one finger touching the lamp-holder which was alive; at the same time she trod with bare feet on the flexible cord (still plugged in to the two-pin socket outlet) and this was faulty on the other pole. The 230-V shock caused her to fall forward on to the bed, pressing the metal shade support against her chest, thus maintaining the circuit until the plug was pulled out of its socket. The apparatus involved was not, of course, supplied by Ealing Corporation. Indeed, Mr. R. Birt, the borough electrical engineer and manager, actively discourages the use of flexible cords of this kind and connectors sent out by his department are circular-braided.

Wiring Regulations Simplified

THE Employees' Guide to the I.E.E. Wiring Regulations produced by the Association of Supervising Electrical Engineers, sets out clearly and in a positive manner what does or does not constitute good installation practice. It omits matters with which the operative is not concerned and includes some admirable working diagrams that are likely to be more easily followed by wiremen than the text they replace or illustrate. The Guide should also be useful as a time-saver to men in higher grades. Though it can be regarded only as supplementary to the complete I.E.E. code, which is the ultimate authority in the interpretation of any doubtful point, it is good enough for all ordinary purposes. The I.E.E. Regulations have to cover all possible contingencies and their necessarily legal complexion debars many electrical men from studying them as carefully as they should. In reducing them to the lowest common denominator, the committee set up by the Association with Mr. W. E. Highfield as chairman has done a job of work that is of general interest.

"E.C.A. in Wonderland"

THIS is the title borne by the sole function which the Electrical Contractors' Association is organising in connection with the Bournemouth Convention. We wondered why, but now that we have received our invitation all is clear. The gathering is being held at "Cuffnells," Lyndhurst, in the heart of the New Forest, which was the home of the late Mrs. Alice Hargreaves—the "Alice" of "Lewis Carroll's" immortal fantasy. Tea is being provided on the lawns surrounding the house ("There is *plenty* of room!" said Alice, at another kind of tea-party), but the prudent organisers have added a note to the programme that "ample shelter is available in the event of passing showers." We trust that this precaution will prove unnecessary.

The I.E.E.'s Position

IN reading our notes regarding the arrangements which have been and are being made for next week's Convention, readers may wonder why the name of the Institution of Electrical Engineers is missing. The reason is given in a note in the official programme to the following effect:—

> "The Institution of Electrical Engineers cannot, as a body, appropriately take an active part in the organising of the Convention, but the Institution has expressed its willingness to assist in every possible way to ensure the success of the Convention."

Many prominent members of the Institution, however, are taking an important part in the Convention proceedings so that it may be said that the I.E.E.'s influence permeates the whole of the programme.

NATIONAL CONVENTION NUMBER

The first National Electrical Convention is to be held at Bournemouth next week. The June 7th issue of the

ELECTRICAL REVIEW

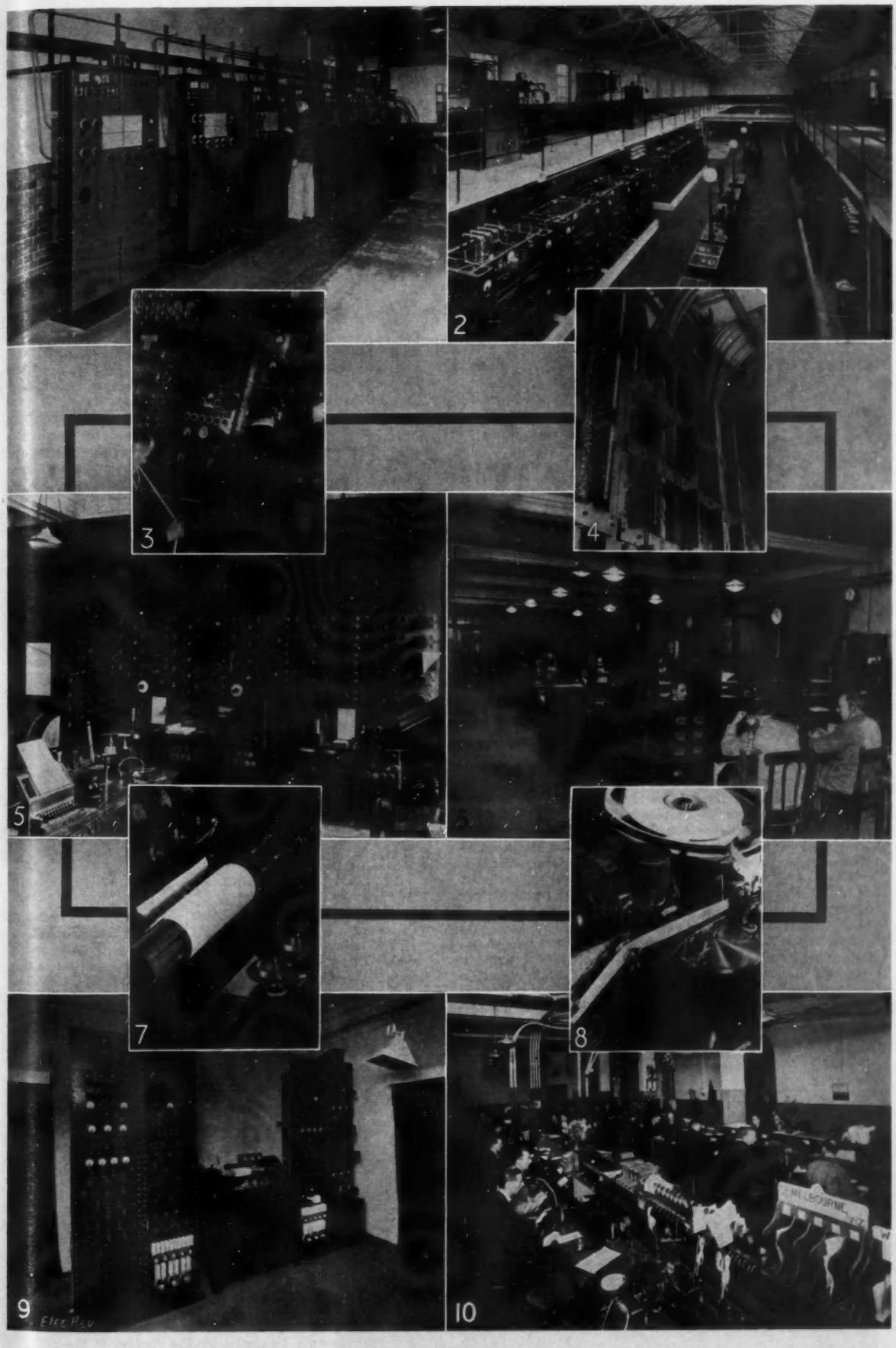
will contain reports and pictures of the gathering, a description of the exhibition, and special articles by well-known electrical men.

Air Force Opportunities

THE chief need in the projected Air Force expansion is to secure the right men for the maintenance of the planes, as construction in the early stages should be within the scope of the existing industrial organisation. Presumably, on that account, no special call has been made for men with higher technical attainments than those of the skilled tradesman, though there should be some opening for electrical engineers in the future, especially for "light-current" men. For every pilot enrolled, eight maintenance men will be required. That mechanical experience will be valued is shown by the acceptance of fitters up to 42 years of age, and of semi-skilled men up to 32 years. Entrants who wish to become radio operators are required to be of superior intelligence and to have had a secondary school education.

Limehouse

THE Stepney undertaking is, we believe, wise in making the installation of grit arrestors wait for the erection of a new chimney, as when fitted to existing boilers they are not always given a real opportunity to achieve the best results. Temporary measures for reducing emissions have been adopted. These have included working the pulverised-fuel boilers at 60 per cent. load for sixteen hours a day only and the burning of more expensive coal with an ash content of 8 instead of 13 per cent. Presumably it is the effect of increased load on the Limehouse station that has brought the matter to a head. The measures taken appear to do more than reintroduce the conditions prevailing before the L.C.C. Housing Committee lodged its complaint, but the Committee considers there has been no real improvement. If that is so it would be interesting to know why.



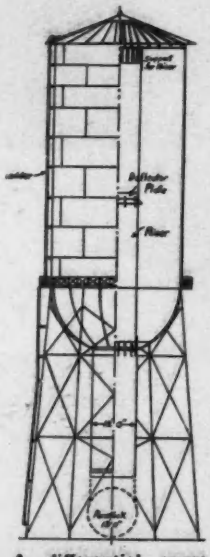
The System of Cable & Wireless, Ltd. **(See page 777)**

1. Bank of eight Marconi short-wave receivers at Brentwood. 2. Short-wave transmitter hall at Ongar. 3. Close-up view of control room panels. 4. Back view of switch lines in control room. 5. Incoming signals control board at the central telegraph station, Moorgate. 6. Some of the turrets in the telephone room. 7 Close-up of facsimile Marconi equipment. 8. A telegraph tape receiver recorder. 9. Facsimile receiving and transmitting equipment. 10. Typical wireless beam circuit gallery at the central telegraph station.

Surge Tanks. By F. Johnstone Taylor

An effective means of regulating pressure on hydro-electric plants

SURGE tanks are used as pressure regulators on hydro-electric plants working under moderate heads. For high-head plants the same effect is obtained by excess-pressure valves for Francis turbines and relief nozzles for Peltons, which come into action in such a way that while the water supplied to the machine may be suddenly reduced that coming down the pipe line is *gradually* reduced by passing off an amount determined by the governor. Neither of the appliances is quite so effective as a surge tank. They waste water and give protection against dangerous pressure rises only, whereas a properly designed surge tank provides a temporary reserve of power to meet a suddenly increased load.



A differential surge tank originated in America

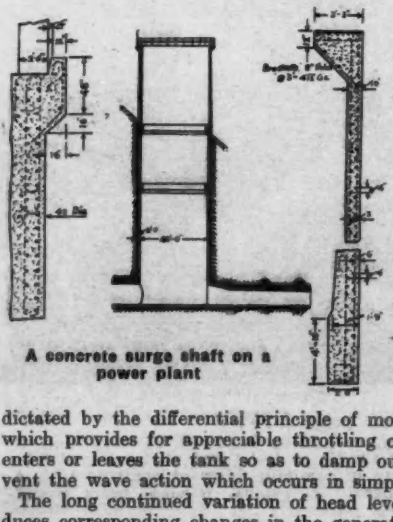
A common arrangement for conducting water to the medium-head turbines is that of an open channel cut along the valley from the intake or diversion works to a suitable point from which it is led to the power house by pipes or penstocks of relatively short length and having a steep declivity. Practically the whole of the fall is effected by the pipes, at the head of which the surge tank is generally placed. It is to all intents and purposes a vertical standpipe and may be constructed of concrete or steel; it may even take the form of a well cut in the adjacent rock, or partly as a well and partly as a tower.

An American Example

The concrete surge shaft illustrated is of a type originated by Johnson in America and handled in this country by Messrs. Blakeboroughs. It is at the end of a tunnel leading from the reservoir at a power plant at San Francisco. The diameter is 40 ft. and the height 160 ft. It is designed to take care of surges 35 to 40 ft. in height and for a load rejection of 125,000 h.p. in 23½ sec. without the pressure rise at the power house exceeding 15 per cent. of the static head.

The shaft is of well and tower form; the well is cut in the hillside to a depth of 112 ft., and the tower is 48 ft. high. The lower portion of the well, cut in the rock, is lined with concrete 2 ft. thick and a similar lining is given to the next 35 ft. cut through the earth, while the top portion tapers to a minimum of 10 in. The pressure tunnel is of horse-shoe form while the outlets from the tank are two 8-ft. 8-in. circular conduits to which the steel penstocks are connected.

A similar construction was recently adopted by the North Wales Power Co., in its Maentwrog works, where the surge tank forms part of a pressure tunnel. The tunnel is straight from the portal to near the surge tank, which is constructed over a curved portion, and afterwards runs straight to the outlet. It is ten feet in internal diameter and is lined by 7 in. of 4 : 1 concrete. The tank is formed by the sinking of a circular shaft into the tunnel to a depth of 95 ft. and is also lined with 4 : 1 concrete to a minimum thickness of four inches, reinforced by the usual arrangement of ½ in. circular and vertical bars, the former at 12 in. centres and the latter at 24 in. The reduction of diameter at the base is partly dictated by the differential principle of modern surge tanks, which provides for appreciable throttling of the water as it enters or leaves the tank so as to damp out surges and prevent the wave action which occurs in simple tanks.

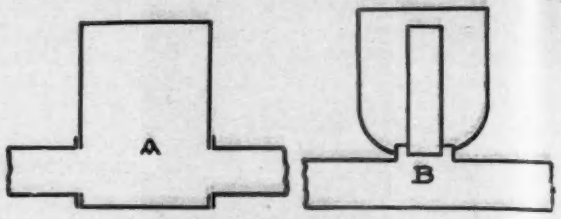


A concrete surge shaft on a power plant

The long continued variation of head level in the tank induces corresponding changes in the generator speed. As the waves take a long time to come to rest, several sudden heavy load changes in succession may cause serious oscillations. The effect of the restricted orifice is to render almost immediately available a large accelerating or retarding head for controlling the flow in the pipe line. The same results accrue from the use of a large simple tank but much more slowly, and the large masses of water produce hunting. There is a definite proportion of areas which will give the proper retardation and acceleration.

Principal Feature

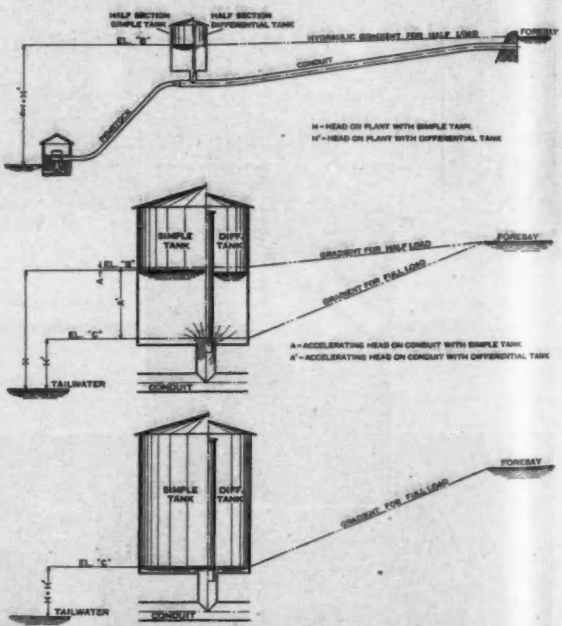
The principal feature of the Johnson tank is the riser in its centre with ports at the lower end connecting the pipe line directly with the storage tank. The rejection of load by



Simple and differential tanks

the turbines causes the water in the riser to spill over into the tank, thus rapidly providing an effective means of deceleration, while in the meantime some water has passed directly from the pipe line into the outer tank. If the load on the turbines increases the water level in the riser rapidly falls and provides the accelerating head needed to give added velocity in the pipe line, while the greater demand for water is met by that passed directly from the storage tank.

The riser is of smaller diameter than its connection to the pipe line and has an annular port at its base communicating with the tank, the characteristics of which depend largely on



A composite comparison of the two tanks. The top diagram shows the conditions pertaining at half-load, the middle being at a few seconds after full load (the water level in the internal riser of the differential tank has fallen to E.L. "C") and the bottom shows full load conditions, surging having ceased

the area of this port. With a simple tank when the load comes on the water falls gradually. The pressure wave resembles a sine curve and the accelerating head on the pipe line accumulates slowly. The level of the tank falls below the gradient corresponding to the new load before the pipe line velocity is accelerated to equal the new demand on the turbines. The surges alternate above and below the new gradient until they become dissipated by the friction of the pipe.

The differential tank functions as (1) an accelerator, (2) a retarder and (3) a storage tank. With a simple tank the corrective action on the conduit velocity accumulates only as fast as the water level changes in the tank, hence the duration of the surge is prolonged and the tank must have a large capacity to supply or accumulate water over a period.

THE NATIONAL CONVENTION

BOURNEMOUTH is busy preparing for next week's National Electrical Convention. When we were there a day or two ago all those engaged in the preparations seemed confident as to the results of their efforts. The hotels are happy about the accommodation problem, and Mr. Finnegan, manager of the Burlington (headquarters), said that catering for a similar number of delegates to the Sales Managers' Conference immediately prior to the Electrical Convention would ensure that the machinery would be at concert pitch. He thought that the recently added sun balconies on the south side of the hotel would be much appreciated by his electrical visitors.

The Pavilion Ballroom

Sixty-two "Mercra" projectors—some vertical and some horizontal—have been installed to floodlight this hotel, and others, including the Royal Exeter (Ediswan) and the Highcliffe (Philips) are to be similarly lighted. We should say that the Highcliffe will have an advantage over the others from the display point of view because, situated as it is on the cliffs on the west of the bay, it can be seen from most of the Convention "load centres."

The Pavilion will be another high light in the floodlighting scheme. "Osira" lamps are to provide red, white and blue for that part of the exterior facing the west terrace, while the south front is to be illuminated in red and green. Then there are the adjacent pleasure gardens and fountain, the permanent lighting schemes of which are sure to be in commission specially for the occasion.

The existing ballroom space in the Pavilion, for the reception and dancing, is to be supplemented by a temporary ballroom of canvas lined with muslin immediately adjacent to the restaurant; indeed it will be virtually an extension of the restaurant. The open west side of the temporary ballroom, immediately near and overlooking the pleasure gardens, will, after dark, resemble as closely as possible a Continental scene relative to such an occasion. Mr. L. H. Harker, the Pier and Pavilion manager, said a similar scheme, but not quite so big, was carried out for the British Medical Association conference, and it was highly successful.

The centre block of the Pavilion has recently been remodelled, and the outstanding feature of the scheme was the installation of a new revolving stage in the concert hall. The stage was inaugurated with, and provided adequate accommodation for, "White Horse Inn." The east and west lounges were also added during the remodelling scheme.

In the Convention those interested have found an opportunity for an effort to make Bournemouth electrically minded in the matter of street lighting. The Bournemouth lighting is nearly all gas at present. A sectional main street-lighting scheme has been operating experimentally for some time in Holdenhurst Road, and this is to be supplemented during the Convention by similar sectional schemes at Lansdowne and Christchurch Roads ("Mercra"), Richmond Hill (Philips sodium lamps and Wardle lanterns) and Gervis Place (Siemens).

It looks as though the exhibition in the Winter Gardens will be another tight fit. True, the space is to be supplemented by a 110 ft. by 40 ft. marquee on the lawn in the north-west corner of the grounds, but the number of exhibitors is greater. This may have been partly responsible for the "unofficial" exhibition to be held at the store of Messrs. J. E. Beale, Ltd. Most of the sixteen manufacturers participating in this will have stands at the Winter Garden. This store has shown commendable enterprise in taking advantage of the opportunity afforded by the Convention. Miss Elsom, who is in charge of Messrs. Beale's electrical department, is on the local committee of the Electrical Association for Women. Although the Bournemouth branch of the E.A.W. was only established quite recently it already has fifty members. On Thursday the E.A.W. is to visit the store.

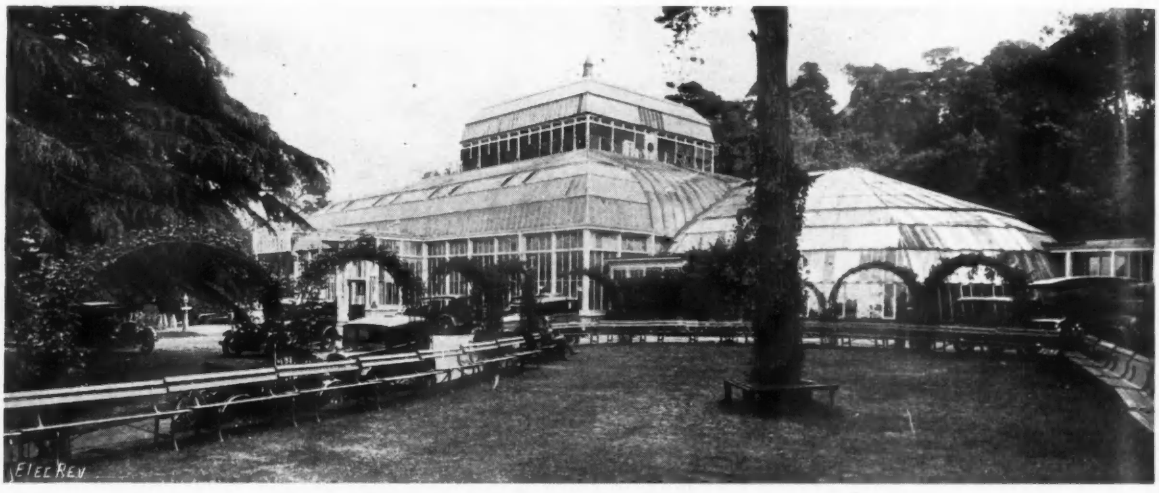
The Bournemouth and Poole Electricity Supply Co., Ltd., will welcome delegates to their new showrooms in Gelverton Road, which are described on page 791. We should have liked to have seen an official visit in the programme in addition to or instead of that arranged to the sub-station.

Although we have already given brief details of the Convention programme we think readers may find further reference useful. In the first place we may mention that the arrangements are in the hands of an executive committee comprising the following gentlemen: Mr. E. E. Hoadley (Pres., I.M.E.A.)

The Hotel Burlington, Bosscombe

is the president; Messrs. W. J. Bache and T. M. Climie, Councillor A. J. Fletcher, Mr. B. Handley, Ald. E. Huntsman, Ald. J. W. Longley, Messrs. C. G. Morley New, G. Porter, P. J. Robinson, L. Romero and E. Seddon, Ald. W. H. Thickett, Mr. J. W. J. Townley and Ald. W. Walker representing the Incorporated Municipal Electrical Association; Messrs. C. D. Taite and A. de Turckheim representing the Incorporated Association of Electric Power Companies; Messrs. S. S. Grant and J. C. Dalton representing the Provincial Electric Supply Association; Messrs. A. F. Harrison and H. J. Randall representing the London Electricity Supply Association; Lt.-Col. F. A. Cortez Leigh representing the Conference of Joint Electricity Authorities, Joint Advisory Boards and Joint Committees; Messrs. R. S. Downe and A. C. Cramb representing the British Electrical Development Association; Messrs. D. N. Dunlop and V. Watlington representing the British Electrical and Allied Manufacturers' Association; Messrs. H. Marryat and L. C. Penwill representing the Electrical Contractors' Association; Messrs. C. H. Cox and C. W. Sully representing the Electric Lamp Manufacturers' Association; Mr. J. Snow Huddleston representing the Cable Makers' Association; and Messrs. A. G. Beaver and A. B. Wildsmith representing the Electrical Wholesalers' Federation. Mr. J. W. Simpson is general secretary.

The headquarters are at the Hotel Burlington, Boscombe, and the Royal Exeter Hotel, Bournemouth. The various sessions and functions will be held at the Pavilion in the East Lounge of which the Convention office will be situated opening at 10 a.m. on Monday next.



The Winter Gardens in which the exhibition is being held

The Exhibition

The Electrical Exhibition will be open to the delegates from 10 a.m. on Tuesday; the official opening by the Mayor of Bournemouth will take place at 12.30 p.m. For the rest of the day and on Wednesday admission will be restricted to delegates, but on Thursday and Friday the general public will be admitted as well.

The following firms are participating in the display :—

Aidas Electric, Ltd.
Arrow Switches, Ltd.
Automatic Electric Co., Ltd.
Automatic Light Controlling Co., Ltd.
Bastian & Allen, Ltd.
Belling & Co., Ltd.
Benjamin Electric, Ltd.
Berry's Electric, Ltd.
Bournemouth & Poole Electricity Supply Co., Ltd.
Bray, G., & Co., Ltd.
British Electrical Development Association.
British National Electrics, Ltd.
British Sangamo Co., Ltd.
British Thomson-Houston Co., Ltd.
Bulpitt & Co., Ltd.
Burnley Components, Ltd.
Carron Company.
Church & Co., Ltd.
Corfield Sigg, Ltd.
Drake & Gorham Wholesale, Ltd.
Edison Swan Electric Co., Ltd.
Electric Lamp Manufacturers' Association.
Electrical Association for Women.
Electrical Contractors' Association (Bournemouth Branch).
Electric & Musical Industries. Ltd.
English Electric Co., Ltd.
Falk, Stadelmann & Co., Ltd.
Falkirk Iron Co., Ltd.
Ferranti, Ltd.
Furn-Art, Ltd.
General Electric Co., Ltd.
Green, G., & Co.
Green, Phillips & Co.
Hague & McKenzie, Ltd.
Hanovia, Ltd.
Harcourts, Ltd.
Hawkins, L. G., & Co., Ltd.
Heatrae, Ltd.
Holophane, Ltd.
Hoover, Ltd.
Horstmann Gear Co., Ltd.
Hotpoint Electric Appliance Co., Ltd.
Jackson Electric Stove Co., Ltd.
J. P. Tubular Heater Co., Ltd.
Johnson & Phillips, Ltd.
Leda Electric, Ltd.
Low, Archibald, & Sons, Ltd.
McGregor & McCallum.
Manor Electric Oven & Fire Co.
Measurement, Ltd.
Metropolitan-Vickers Electrical Co., Ltd.
Moffats, Ltd.
Radiovisor Parent, Ltd.
Revo Electric Co., Ltd.
Reyrolle, A., & Co., Ltd.
Rheostatic Co., Ltd.
Santon, Ltd.
Scholes, G. H., Ltd.
Siemens Bros. & Co., Ltd.
Siemens Electric Lamps & Supplies, Ltd.
Simplex Electric Co., Ltd.
Stokes Appliances, Ltd.
Sun Vic Controls, Ltd.
Thomas, Bertram, Ltd.
Tricity Cookers, Ltd.
Unity Heating, Ltd.
Venner Time Switches, Ltd.

Wednesday morning's session is to be devoted to a joint meeting at which the speakers will be Sir Archibald Page (chairman of the Central Electricity Board), Mr. P. J. Robinson (I.M.E.A.), Mr. J. C. Dalton (Companies' Associations), Mr. H. Marryat (E.C.A.), Sir Felix Pole (Manufacturers), Sir William Ray (executive chairman of E.D.A.), and Sir John Brooke (vice-chairman, Electricity Commission).

The one function being organised by the Electrical Contractors' Association is described as "E.C.A. in Wonderland." We refer to this in a leaderette.

We may say here that the Bournemouth Branch of the E.C.A. is taking a stand in the exhibition but will not display apparatus on this occasion. Instead (Mr. A. R. Wilson, the hon. secretary, tells us) the stand will be fitted out as an information bureau.

A cruise in the bay is being arranged for Wednesday evening, and there will be dancing, bridge and refreshments available. The delegates will embark at 8.30 p.m. and return at midnight.

Electricity in Industry and the Home

At the third session on Thursday morning a joint paper on "Industrial Power Supply" will be presented by Messrs. H. Hobson (general manager, Central Electricity Board), F. Forrest (I.M.E.A.) and C. D. Taite (Power Companies) and a discussion will follow. At 1 p.m. the Electrical Association for Women is holding a luncheon at the Pavilion.

In the afternoon Mr. W. N. C. Clinch (I.M.E.A.), Mr. C. Nadaud (Power Companies), Miss C. Haslett (E.A.W.) and Mr. T. E. Alger (E.C.A.) will present a joint paper on "Domestic Electrical Development" for subsequent discussion. The evening function takes the form of a banquet which is timed early (6.35 for 7.15) to give ample time for dancing afterwards.

The I.M.E.A. will hold its annual general meeting in the Concert Hall, Pavilion, on Friday morning, and in the afternoon a series of trips has been arranged. There are seven of these, and the places to be visited include Salisbury, Lulworth Cove, the New Forest, Poole Potteries, Beaulieu Abbey, Dorchester, Weymouth, Wimborne, &c.

Dances and cabarets are being organised for Friday evening at the Burlington and Royal Exeter Hotels. On Saturday delegates are invited to inspect the Bornemouth sub-station.

Arrangements are being made with the Electric Vehicle Committee to organise a mobile display of electric vehicles. There will be a parade and an official inspection by the President at 12.30 p.m. on Monday at the Pavilion car park. The following companies are participating in the parade :—Auto Electric Cars & Trucks (Nelco, Ltd.), the D. P. Battery Co., Ltd., Electricars, Ltd., the Metropolitan-Vickers Electrical Co., Ltd., Messrs. A. E. Morrison & Sons, Ltd., Messrs. Partridge, Wilson & Co., Ltd., and Victor Electrics, Ltd.

During Monday delegates will be arriving and registering. The Bournemouth Rotary Club is holding a luncheon at which the President will deliver an address. In the evening Mr. and Mrs. Hoadley will receive the delegates at the Pavilion and there will be dancing.

On Tuesday the Convention proceedings will commence with a civic welcome by the Mayor of Bournemouth, following which Mr. Hoadley will give his presidential address. Before the luncheon interval the Mayor will open the exhibition. At 4 p.m. the ladies are invited to take tea with Mrs. Hoadley at the Pavilion. In the evening the Mayor and Mayoress will hold a reception after which there will be a dance.

Cable and Wireless

The I.E.E. Wireless Centre inspects the system

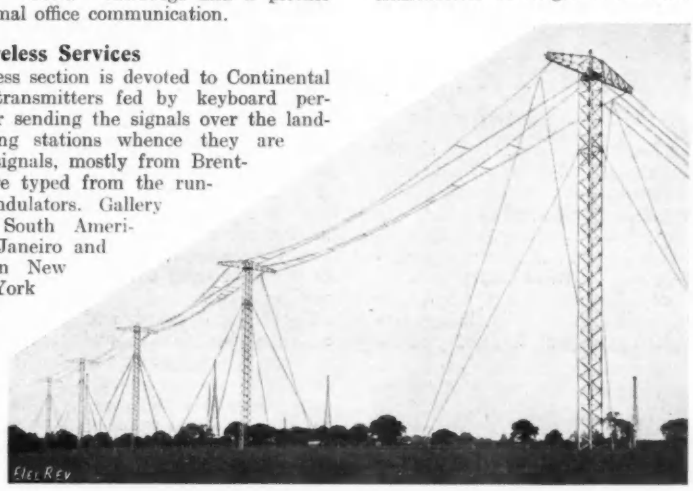
THE annual outing of the Wireless Centre of the Institution of Electrical Engineers on May 25th commenced with a quick morning tour of the central telegraph station at Moorgate of Cable & Wireless, Ltd., from which public radio and submarine cable communication services are maintained with most parts of the world.

This concern controls and operates over 160,000 miles of telegraph cables, almost two-thirds of the world's total mileage, and maintains a small fleet of repair ships at strategic points in both hemispheres. In England it operates nine wireless stations, including the Empire beam stations capable of transmitting messages at the rate of over 300 words per minute, which is a record speed for any system of telegraphy. In London alone the company employs more than 600 messenger boys and the total number of its employés at home and abroad is nearly 10,000.

The whole of this system of communications is controlled from the central telegraph station in Moorgate. The telephone room contains four turrets on which the exchange lines used for the "Phonogram" service terminate, and also the 150 or so private lines from certain customers which are used solely for sending and receiving telegrams. There are also four teleprinters on the "Telex" exchange and a private branch exchange for normal office communication.

Wireless Services

Gallery E of the wireless section is devoted to Continental services. Wheatstone transmitters fed by keyboard perforators are employed for sending the signals over the landlines to the transmitting stations whence they are radiated. The received signals, mostly from Brentwood on this gallery, are typed from the running slip from Marconi undulators. Gallery F serves, besides the South American services to Rio de Janeiro and Buenos Aires, the main New York and the New York stocks services. The latter provides direct communication between certain clients' offices in London and their correspondents' offices in New York. The main New York service is worked on the "double current cable code channel" system, in which the signals are channelled to allow of a high aggregate speed, while the channel speeds remain within the capabilities of automatic perforators and printers.



The Cable & Wireless receiving station at Brentwood

The same system is used also on the Bombay, Capetown and Melbourne radio beam circuits, where it permits of reception on printed tape at speeds comparable with the fastest Wheatstone speeds.

The beams to India, South Africa, Australia, and Canada, are served from Gallery C. The first three are worked in a similar manner to the New York service and the last-named uses Wheatstone transmitters and Marconi undulators and typewriters. On the Bombay beam there is in use, on trial, a unit for the automatic repetition and subsequent comparison of d.c.c.c. signals on wireless circuits.

Gallery D serves the East African, Japanese, Chinese and Near East circuits, all worked by Morse on Marconi undulators and typewriters from the radio receiving stations at Somerton and Brentwood and forwarded by Wheatstone transmitters to the radio transmitting stations at Dorchester and Ongar.

The Local and Cablegram Rooms

The Local Room contains all the private telegraph circuits to such customers as the newspapers, news agencies, banks, &c., about thirty in number, mostly using teleprinters as the means of communication. There are teleprinter circuits to nine branch stations.

Two cables to Spain are also worked from Gallery D. Street pneumatic tubes connect the company's main station to several nearby branch offices, such as Fenchurch Street and Old Broad Street; also the G.P.O. and other cable companies' offices. The facsimile room receives and transmits pictures by the latest Marconi apparatus operating on the beam radio system. At present two services are available—to New York and to Melbourne. A half plate picture can be transmitted or received in about twenty minutes, under good conditions.

From the cable room landlines to Porthcurno, near Penzance, connect to the main submarine cables. A system of relays, whereby the signals are regenerated and passed on in perfect form at each relay station, is employed. The actual places with which London works are Singapore, Capetown, Alexandria, Rio de Janeiro, Buenos Aires, Carcavellos, Montreal, Bombay, Paris, Hamburg, Antwerp and Athens, but telegrams can be dropped at intermediate relay stations on the "chains" when necessary. The terminal station, by means of a selective (signal impulsing) switch device, can call in the intermediate distant station required, start its receiving instrument, and, after sending the messages, cut out the distant recording instrument and put the "chain" back for "through" working.

This system of relays and regenerated signals depends mainly on accurate synchronisation of the speed of the motors driving the various instruments in each of the stations forming links of the chain; "phonic" motors are employed.

Close to the Stock Exchange, in Shorter's Court, is a branch office, which has direct wireless communication with New York on long and short waves, through the relays at the central station wireless control room, and thence to the wireless transmitters at Ongar and Carnarvon. From this branch office a service is given for Stock Exchange traffic, involving the minimum possible delay.

The Radio Section Control

In the Control Room is centralised all line terminal equipment, leaving the circuit operating tables almost entirely free. The only electrical signalling equipment on the tables is a Wheatstone transmitter, an undulator (reception) and Morse keys and buzzers for the exchange of remarks between circuits and control room. It is also used to centralise all technical supervision of both outgoing and incoming telegraph signals, all of which must pass through the control room.

The use of voice-frequency channelling, which means the conveyance of telegraph signals between the central telegraph office and the radio stations (transmitting and receiving) by means of multi-tone channels carried on single telephone pairs, makes it possible to carry as many as ten circuits on a single telephone pair, but requires a multiplicity of filters and a.c. convertors, the equipment being housed in the control room, mounted on standard 19-in. telephone racks. Telegraph relays, speed counters, line testing, and measuring equipment, &c., are also accommodated in the control room. All lines used for purely telegraphic purposes terminate in the control room, the provision of cords and jacks making for great flexibility.

The Ongar Station

From Finsbury Circus the party drove in motor coaches to the Ongar (North Weald) radio transmitting station, which uses both short and long waves. A 40-kW Marconi installation works with omni-directional aerials to New York and other distant stations, and incorporates a quick wave-changing device for using 16, 22, 25 or 32 metres. There are also four 20-kW Marconi beam transmitters for operating to New York, Africa, Egypt, Turkey, Las Palmas and Continental countries on wave-lengths between 14 and 40 m. A beam transmitter is used for additional short wave services to Vienna and other Continental centres.

In the long-wave section there is a 110-kW Marconi 9,630-metre transmitter principally for the transatlantic services. Beside it are 5, 10, 15 and 25-kW Marconi transmitters for operating to France and other European countries on wave-lengths of 3,950, 2,950, 4,196 and 5,309 m. Both long and short wave plant is arranged for high-speed transmission by the absorption key method. The control land lines between London and Ongar consist of six voice-frequency telephone

lines each capable of carrying five channels, providing thirty lines of communication.

For long waves the masts are 91 m. high surmounted by cross arms. The 110-kW set has an eight-wire type aerial of a total length of 1,370 m., with an earth screen tuned at both ends. The two-wire feeders are carried on poles. The beam aerial arrays are of the Marconi "uniform" and compact "series phase" types, connected by concentric copper feeders. The omni-directional short-wave aerials are supported on triatics fixed between the masts of various aerial systems and are connected to the transmitters by means of concentric copper feeders.

The Power Supply

The County of London E.S. Co., Ltd., delivers a.c. at 11,000 V to the power house, wherein it is transformed down to 3,400 V for driving two 250-kW motor-generators. These produce d.c. at 240 V for driving the various motor-generators (which are automatically regulated for voltage and power factor) that supply the several transmitters. Besides filament-heating and grid-bias machines, two 150-kW 12,000-V machines energise the anode circuit of the 110-kW long-wave transmitter. The smaller transmitters derive their high-voltage supplies from mercury-vapour rectifiers mounted on the valve galleries. The power house stand-by plant consists of three 50-kW Vickers-Petters and four A.B.C. 120-kW oil engine generators supplying d.c. at 240 V.

Luncheon was served at the Theobalds Park Hotel, Waltham Cross. The original Temple Bar, re-erected after removal from the Strand, forms an imposing entrance to the park.

The Brentwood Receiving Station

The afternoon was spent at the Brentwood station which contains thirty-seven receiving sets, covering all wave-lengths from 15 to 30,000 m., for the reception of messages from New York (Stock Exchange service), South America, Europe, Asia, Africa, &c. Nine of the twenty-one short-wave receivers are of the Marconi diversity type which use two aerials widely spaced apart to minimise fading. Eight receivers work on wave-lengths of from 2,000 to 5,000 m., and eight sets operate between 4,000 and 30,000 m.

Brentwood has twenty-seven series phase aerials on wood poles varying in height from 35 ft. for the shorter wave-lengths to 80 ft. for the longer ones. There are four uniform beam aerials, two for day and night service with Salisbury and two for reception from Nairobi. Eight omni-directional aerials are employed as required, and for medium wave signals there is a large Bellini-Tosi loop with a number of open aerials for reception on the cardioid system, the long wave aerial system being similar.

Three telegraph and eighteen telephone lines link Brentwood with London and similar communication exists with Ongar. A distribution board enables any aerial to be connected to any receiver; also two or three aerials may be connected to any short wave receiver to provide diversity reception, which minimises fading.

Co-operation in Development. By J. N. Waite, M.I.E.E.

Improving the relationships between electricity suppliers and others

FOR the first time in the history of the industry all the bodies primarily interested in electricity supply are meeting together next week at Bournemouth at the first National Electrical Convention. Here will be represented the electricity supply authorities, both municipal and company, and also the Central Electricity Board, electrical plant and apparatus manufacturers, electrical wholesalers and electrical contractors.

The main objects of the Convention are (1) To promote the progress of electricity supply, which, in its train, brings progress in the use of electrical plant and apparatus, and provides wiring work; and (2) to promote co-operation between the bodies interested in this progress. The latter object is a natural concomitant of the first and principal object.

Mr. J. N. Waite, M.I.E.E., F.I.F., is general manager and engineer of the Hull Corporation Electricity Department

All parties are agreed that co-operation is desirable, but up to the moment the actual amount of co-operation achieved is relatively small, and is the result of individual efforts in particular localities or between individual groups. If co-operation is to become really effective it is necessary to arrange the terms and conditions between the respective parties on a national scale, to which all the individual bodies, firms or authorities could be urged authoritatively to subscribe and to observe with benefit all round.

There are three main bodies concerned in the matter:—(a) Electricity supply authorities; (b) manufacturers; and (c) electrical factors and contractors. In each of these groups there is no single body or association which can claim to represent all the people concerned, but it would certainly be a step in the right direction if the existing bodies, namely, the Incorporated Municipal Electrical Association, the Power Companies' Associations, the Wholesalers' Federation, and the Contractors' Associations, met together and arrived at a national agreement. If this were done there would be sufficient influence available to bring into the fold the isolated units outside these associations, or, at any rate, to enforce observance of any agreement arrived at on a large scale.

The Predominant Partner

It has to be recognised that the major partner is the electricity supply industry, for it is the progress of this industry which regulates the rate of advance of the manufacturer, the wholesaler and the contractor. While the rate of progress of the supply industry has been reasonably good since its inception, the results achieved by many undertakings show that it is possible to make faster progress than is the general rule, and as the great possibilities of extension in the domestic market are now being generally realised, the present time seems to be opportune for an attempt to rationalise the relationships between the various sections of the industry on a national basis.

Parliament has indicated in no uncertain way that it considers a cheap and abundant supply of electricity to be a national necessity, and that it will not allow any sectional or private interest to stand in the way. This statement holds good whatever political party holds the reins of government, and, in passing, I would put forward the opinion that Parliament has a much clearer idea of the vital importance of a cheap and abundant supply of electricity than have many of those actually in control of supply undertakings.

All the parties mentioned earlier have a part to play in providing cheap and abundant electricity, for when electricity itself is cheap, its use is partly dominated by the cost of the necessary consuming apparatus and wiring to the public. Therefore a supply authority's duties are not ended by providing a supply—it must also make it possible for the supply to be used. Thus, the supply authority must come into the field which manufacturers, wholesalers and contractors have always considered their own close preserve, and in invading this field friction is bound to arise—it has already arisen. If this invasion were recognised as inevitable and in the best interests of the electricity user, some of the friction could be avoided; and if mutual goodwill and tolerance could be created and maintained, the friction could be kept to the minimum, and a set of rules, mutually agreed, be drawn up to act as a guide when interests conflicted.

The Fair Trading Council

It appears to me that a common meeting ground already exists in the Fair Trading Council. I do not like that particular name, but it could be changed if necessary. The present rules and constitution are not wide enough to cover the ground proposed in this article, but again, these could be altered to meet changed conditions. The manufacturers, wholesalers, contractors and retailers are now represented on this Council, but the supply authorities are absent. That is like "Hamlet" without the Prince of Denmark.

The first National Electrical Convention meets next week. I urge that it would be particularly fitting for the various bodies concerned to get together as soon after the Convention as possible, under the ægis of the Fair Trading Council, to explore the position and endeavour to arrive at a national agreement to govern the relationships between the various bodies directly interested, and so clear the way for real co-operation between the parties, with a view to making greater progress in electricity supply and its manifold uses. Such co-operation could not fail to produce beneficial results to the parties, and what is more important, to the public at large.

The Proving House. By T. C. Gilbert, A.M.I.E.E.

America shows the way

IN view of the fact that the I.M.E.A. has expressed itself in favour of the establishment of a proving house for electrical equipment, it is more than likely that the proposal will be the subject of at least informal conversations at next week's Convention. When it is remembered that another important electrical gathering takes place during June, the International Electrotechnical Commission meeting in Holland and Belgium, at which the question of standardisation and like matters receive considerable attention, it will be seen that the subject is a live one for discussion at the moment.

The Electrical Industry Committee of the British Standards Institution is, of course, the British National Committee of the International Electrotechnical Commission. The principal objects of the B.S.I. are to co-ordinate the efforts of producers and users for the improvement, standardisation and simplification of engineering and industrial materials; to simplify production and distribution; to eliminate the waste of time and material involved in the production of an unnecessary variety of patterns and sizes of articles for one and the same purpose; to set up standards of quality and dimensions, and promote the general adoption of British Standard Specifications. Although several Government departments are represented on the Electrical Industry Committee, the B.S.I. has no official standing, and its work is mainly carried on by means of grants received from the Government, professional institutions, and industrial and trade organisations, as well as by sales of its publications.

[*Elliott & Fry*
Mr. T. C. Gilbert

The position is rather different in America, where the initiative is taken by the fire insurance offices, and it may be of interest to trace the rather intricate organisation set up in that country in order to establish standards and approve electrical apparatus. The following information is taken mainly from the "National Electrical Code Handbook," by A. L. Abbott (published by McGraw-Hill).

The title page of the handbook states that the Code is "The regulations of the National Board of Fire Underwriters for electric wiring and apparatus as recommended by the National Fire Protection Association," and that the Code is an American Standard approved by the American Standards Association. Reference is made on the inside of the front cover of Underwriters' Laboratories, Inc., in connection with standards for the construction of electrical fittings and materials and the examination and testing of fittings and materials.

The general purpose of the National Fire Protection Association is "to promote the science and improve the methods of fire protection and fire prevention; to obtain and circulate information on these subjects and to secure the co-operation of its members in establishing proper safeguards against loss of life and property by fire." Revisions of the Code are made by the Electrical Committee of the N.F.P.A. In order that a new edition of the Code may be approved as an American Standard, the members of this Committee are selected in conformity with the requirements of the American Standards Association.

Fire Underwriters' Activities

The National Board of Fire Underwriters is an association of the fire-insurance companies commonly known as "stock" companies, to distinguish them from the mutual companies. Membership consists of companies only, not individuals. The purposes of the N.F.B.U. are to collect and compile data pertaining to fire losses, fire protection and other matters pertaining to the operation of the fire-insurance business, and to participate in the work of related bodies such as the N.F.P.A., and through the Underwriters' Laboratories to establish standards for fire-protection apparatus, for fire-resistive types and details of building construction, and for manufactured products that may involve fire risks if not properly designed and constructed.

The N.F.B.U. takes part in the revision of the Electrical Code only through its representatives who act as members of the Electrical Committee of the N.F.P.A. Code revisions, after their adoption by the N.F.P.A., are recommended by that organisation to the N.B.F.U., and are then adopted by the latter as its standard for the installation of electrical work. There is no actual connection between these two organisations of such a nature that either body has authority to issue instructions to the other; hence there is no obligation on the part of the N.B.F.U. to accept the Code revisions made by the N.F.P.A. As a matter of fact, however, any Code revision adopted by the N.F.P.A. is practically certain to be entirely acceptable to the N.B.F.U.

Local underwriters' boards or bureaus are purely local organisations of fire-insurance companies operating in certain territories or engaged in certain phases of the business. They have no direct connection with the N.F.B.U. except that the company members of a local board or bureau are usually members of the National Board. Nearly all of these local boards operate electrical inspection departments, all of which employ the Code as a standard, though quite commonly supplementary requirements are enforced, such requirements being in the nature of interpretations of Code rules or more detailed specifications for certain installation methods.

The American Standards Association

The chief purpose of the A.S.A. is to bring together manufacturers, distributors, consumers, technical specialists, and any others directly concerned with standardisation projects, and through the proper procedure to approve specifications for materials or methods as "American Standards."

The membership of the association is very similar to that of our own B.S.I., as it includes all of the leading technical societies of the United States, a number of trade associations, and six United States Government departments. Before any specification is approved as an American Standard it must have received substantially unanimous approval by a special committee which is in every case fully representative of all members interested in the proposed standard.

Approval of the National Electrical Code by the A.S.A., therefore, constitutes recognition of these specifications as a standard of practice by the most authoritative body that could be set up for this purpose, apart from the United States Government. Participation in the procedure of the Association by six Government departments, and particularly by the Department of Commerce acting directly through the Bureau of Standards, may be considered as equivalent to semi-official governmental approval of any edition of the Code that is approved as an American Standard.

Procedure in Code Revision

The Electrical Committee of the N.F.P.A. consists of about eighty members and alternates. These are so apportioned to the various groups as to form a body that is representative of the entire electrical industry. Members and alternates are nominated by the group which they represent and are in most cases electrical inspectors, or engineers serving in other capacities, who are chosen for their outstanding ability to deal with the problems of Code revision. The Committee includes a number of specialists who are nationally recognised as authorities in certain branches of electrical engineering.

Each article of the Code is assigned to a sub-committee of the Electrical Committee. Any proposal for revision of a certain article is referred to the sub-committee on that article and is duly considered by it, and, if found desirable, suitable paragraphs are drawn up to incorporate the change or addition in the Code. In their consideration of proposed provisions the article committees frequently secure outside assistance by appointing "technical sub-committees" which are asked to investigate and report on special matters; members of these need not be members of the Electrical Committee.

Rules formulated by the article committees are presented and discussed at meetings of the Electrical Committee and are adopted or rejected by votes of the entire Committee. After action by the Committee on all articles the complete Code embodying the revisions adopted is submitted for adoption at the next annual meeting of the N.F.P.A. After this, each new edition is submitted to the A.S.A. for approval as an American Standard, and it becomes an authoritative national standard.

In order to protect the general public and those who install and manufacture electrical products, it is necessary in the first place to establish standards, consisting of specifications covering the essential features of the products as regards safety and continued serviceability. The standards having been set up, some means must be provided whereby the installer and

the final purchaser who wish to obtain standard products may be assured that certain materials and devices fulfil the requirements of the standard specifications. Underwriters' Laboratories, Inc., is an organisation formed for the purpose of rendering this service of formulating standards, testing manufactured materials, and certifying those materials that conform to the standards.

Standards are formulated by the Laboratories for a large number of the more common electrical products, and these standards are always consistent with National Code requirements. After a standard has been set up for a given material or device, any manufacturer who so desires may submit his product to the Laboratories for examination and test. If the material or device is found to comply with the standard, a summarised report of the findings is issued in card form, and the material or device is included in the "List of Inspected Electrical Appliances" published by the Laboratories.

Following the original tests and listing, any one of three courses is open to the manufacturer: (1) he may pay an annual fee for "Re-examination Service," and the Laboratories then simply test new samples at intervals, to determine whether the standard of quality is being continuously maintained. Under (2) the "Inspection Service," regular inspections and tests of the product are made at the factory by the Laboratories' engineers, and supplementary examinations of the product are made at the Laboratories as needed, whilst with (3) the manufacturer may elect to take the "Label Service." Under this plan the product is even more thoroughly supervised than under plan (2) by means of factory tests and inspections, and the manufacturer is authorised to affix to the product a distinctive label furnished by the Laboratories.

The "Listed Inspected Electrical Appliance Cards" are forwarded as soon as issued to all subscribers to this service. The "List of Inspected Electrical Appliances" is furnished without charge on request.

Although the standards organisations in this country and in America have many points of similarity, there is one direction in which they are entirely different; the American seeks to eliminate risks of fire and damage to property, whilst we are more concerned with shock or injury to persons. This is explained, I think, by the fact that we employ domestic voltages double those in common use in America. While the lower voltage may reduce shock risks, the risk from fire must be materially increased. The inherent safety of installations in this country probably means that we shall look in vain for any effort on the part of the insurance companies in this matter of standardisation and approval of materials and apparatus, and it is more than probable that the whole effort will have to come from the industry itself.

We have the organisation in the British Standards Institution, and we have the nucleus for a set of standards in Section 13 of the I.E.E. Wiring Regulations ("Requirements in Regard to the Design and Construction of Electrical Apparatus," Regs. 1301-1346), in which many of the existing British Standard Specifications are adopted, and the steps necessary to be taken in order to establish a proving house appear to be both few and short if something on the American lines is contemplated.

The procedure followed in Canada is very similar to that of the United States, except that the Canadian Electrical Code is actually published as a Canadian Standard by the Canadian Engineering Standards Association. It is of interest to note that amongst the members of the C.E.S.A. Committee on electrical matters we find the International Brotherhood of Electrical Workers represented; we look in vain for any representation of the Electrical Trades Union or even the Association of Supervising Electrical Engineers on the Electrical Industry Committee of the B.S.I., although the latter have been represented upon special committees. It cannot be denied that practical experience of this nature will be of the greatest value when the question of setting up standards for electrical equipment is seriously discussed.

Interconnection in France

ANOTHER step in the interconnection of French power networks has been made with the recent completion of the first section of the sub-station at Viviez by the Société de Transport d'Energie Rouergue-Auvergne, which is designed to tie in that company's network with the Saint Victor sub-station (terminus of the Midi company's lines, and of the lines of the Société des Cevennes) with the Brommat power plant of the T.E.M.A.C.

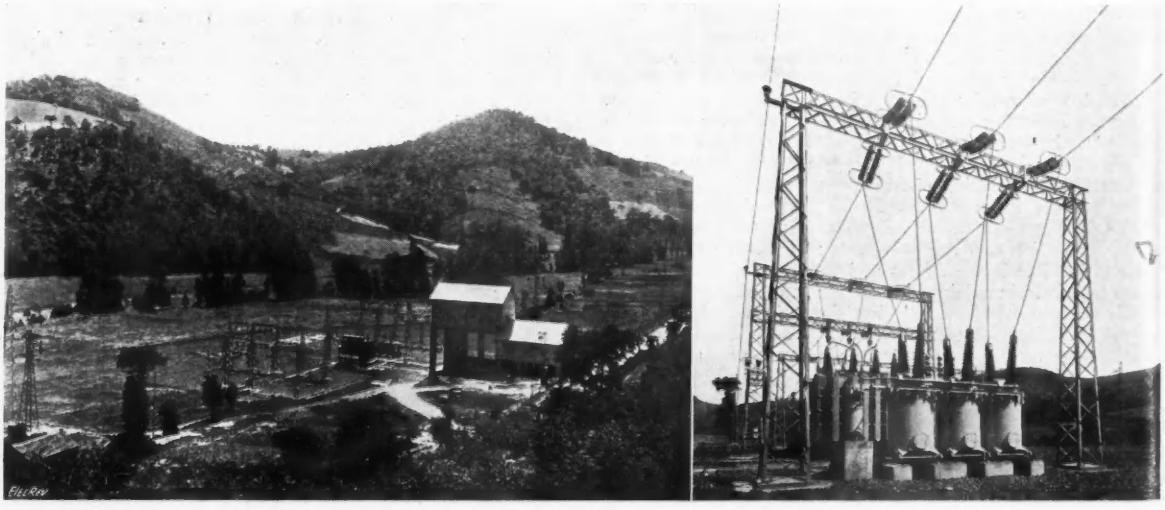
The heavy working conditions made it necessary to use insulators composed of four elements, calculated for a service pressure of 155 kV. They were tested to 370 kV dry and 340 kV under rain.

The section switches are of the three-pole revolving type operated by levers with locking mechanism. The contacts are designed for 600 A. The 150-kV connections are electrolytic copper tubes of 2.20/2.51 in. diameter, and hollow cables, thus minimising corona effect. The cables are anchored with double 11-string insulators.

The oil switches are of the Merlin & Gerin 155-kV type and are capable of rupturing 1,500,000 kVA. They were tested at 400 kV dry and 350 kV wet. This type has six breaks per pole, the total length of break being about 10 ft. The weight of the switches without oil is in the neighbourhood of 13½ tons.

The control of the gear is by 115-V d.c. motors. Each switch has a manhole in the cover, permitting overhauling of the switch without taking it apart. The connection between the 150-kV and the 60-kV bus-bars is by means of a 30,000-kVA, 155/60-kV, three-phase star-star transformer. The neutrals are brought out so that they can be either earthed or insulated as desired. The neutrals are taken to single-pole section switches, which are earthed. The transformer is cooled by forced ventilation.

On the 60-kV side the oil switches are of the 75-kV type, built for 500 A, with a minimum guaranteed capacity of one million kVA. There are six breaks per pole, the total opening being about 7 ft. For auxiliary services there is a 100-kVA transformer connected to the 60-kV side. The control and instrument board is in a building alongside the outdoor sub-station.



A general view of the Viviez sub-station and a "close-up" of the plant

Electrical Associations at the Fair

THE British Industries Fair at Castle Bromwich, Birmingham, closes to-day, having been open since May 20th. The attendance seems to have been much the same as last year, although the final official figures are not yet available.

It is also too early as yet to say much regarding the amount of business done, although we have heard of the placing of some fairly substantial electrical orders.

We reproduce below photographs of a few of the electrical stands and also report the speeches at two of the electrical functions arranged in connection with the Fair.

The Prince's Inspection

The Fair was visited by the Prince of Wales on Thursday afternoon, May 23rd. He flew down from London, and as he stepped from his machine was greeted by the Lord Mayor of Birmingham, who presented Mr. T. J. Kennedy, president of the Birmingham Chamber of Commerce, Mr. P. J. Plant, chairman of the Fair Committee, and others, and subsequently inspected the exhibits in various sections. In the Electrical Section Mr. T. R. Martin, chairman and honorary secretary of the Section, and Mr. E. J. Jennings, commercial manager of the Birmingham Electricity Supply Department, both of whom have been closely identified with the progress of the Electrical part of the Fair for many years, and Mr. E. E. Hoadley, president of the I.M.E.A. and of the National Electrical Convention, were presented to His Royal Highness, who later in the afternoon took tea with the Management Committee.

Messrs. R. C. Graseby and E. E. Sharp were also presented to the Prince on the stand of Venner Time Switches, Ltd. His Royal Highness showed special interest in the company's prepayment meters, 1/100th sec. electrically-operated stop watch, and controlling apparatus for giving position to ships from wireless beacon lighthouses. The Prince also spoke with Mr. Sharp regarding the latter's travels overseas in the interest of export trade. The centre portion of the Venner stand (which is over 100ft. long) is shown above. There is a rest room at each end.

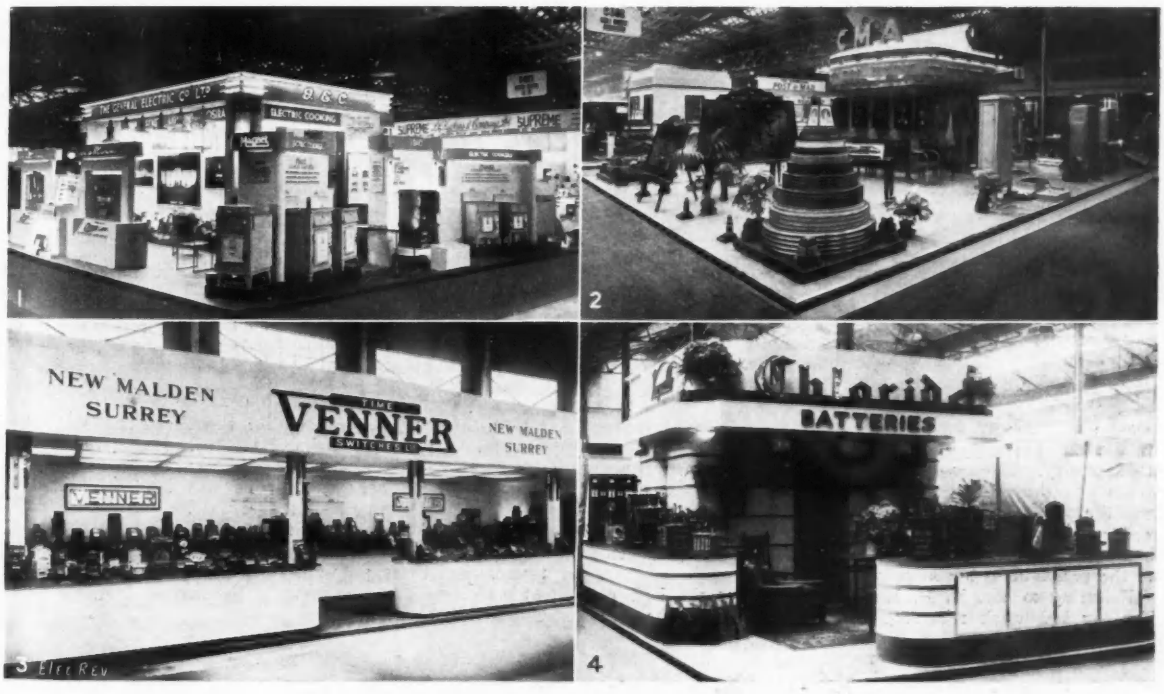
tribute to the valuable work carried on by the Association in that part of the country. The branch, which could be said to have been born in the B.I.F. buildings nine years ago, should be proud of the fact that it was the only woman's organisation which received an official invitation to the Fair.

The part played by the E.A.W. in electrical development was recognised by the electrical industry as one which could not be over-estimated. Miss Haslett had stated at the recent E.A.W. Conference that "women must be allowed to state their views." It was, however, not a question of "allowing"; the supply industry wanted them to express their opinions and it would be absurd for anyone in the electrical industry not to welcome the assistance that the E.A.W. could provide. Electricity was available for practically every purpose, and it was significant that, while the electrical section of the Fair had grown, the gas industry's usual display had disappeared.

Speaking of the progress made in electricity supply during the past twenty-five years, Mr. Jennings said that sales of energy had increased from 125 million kWh to 13,900 million kWh, and consumers from 700,000 to 6½ millions. To refute the statement that electricity caused unemployment it was a fact that there were three times as many persons employed now as in 1910. In this country there were still six million persons without the benefits of electricity, but these were being given supplies at the rate of half a million a year. The Electrical Development Association was starting a Press campaign with the hope of increasing the number of consumers by at least a million during the next year, and he was sure the E.A.W. would do its share in furthering this very laudable aim.

Mrs. J. B. Burman, president of the Birmingham branch, thanked the Chamber of Commerce and the Fair Management Committee for their hospitality. She had only one complaint about electricity, she said. With electric fires there was nowhere to burn rubbish, and she suggested that some enterprising manufacturer might produce a cheap electric refuse destructor.

Mr. E. E. Hoadley was also a guest at the tea. In his remarks he said that some years ago at a convention at Bath he was laughed at because he advised supply authorities to "cultivate the women." Women worked seven days a week, and consequently provided a better load factor than industrial concerns. The E.A.W. was in a position to bring in a great deal of profitable business to the industry.



Electrical Stands at the British Industries Fair

1. The General Electric Co., Ltd. 2. The Cable Makers' Association. 3. Venner Time Switches, Ltd. 4. The Chloride Electrical Storage Co., Ltd.

An E.A.W. Visit

The Electrical Association for Women (Birmingham and Midlands Branch) was fortunate enough to choose for its official visit to the British Industries Fair at Castle Bromwich last week the same afternoon as H.R.H. the Prince of Wales made his tour, and in order that everyone might have a chance of seeing him, the tea given by the Birmingham Chamber of Commerce and the Fair Management Committee was postponed for three-quarters of an hour.

Welcoming the E.A.W. members, Mr. E. J. Jennings paid

An Electrical Luncheon

On Tuesday last the Birmingham Chamber of Commerce and the Fair Management Committee entertained to luncheon about 150 guests on the occasion of the official visits of ten

of the principal electrical and allied associations of the country. The chair was taken by the Earl of Dudley. A hearty welcome was extended to the visitors by the Lord Mayor on behalf of the City of Birmingham, and by the Earl of Dudley on behalf of the Birmingham Chamber of Commerce.

Proposing the toast of "The Industry," Mr. H. G. Williams, M.P., executive director of the Incorporated Association of Electrical Power Companies, congratulated the City of Birmingham on its enterprise in providing an opportunity of seeing what might be called the heavier industries. The Fair was a joint enterprise of the Birmingham Chamber of Commerce and the Department of Overseas Trade, and was one of the features of industrial life in this country. In the opinion of Mr. Williams the general layout of the Fair was excellent.

The stands of Messrs. Geo. Bray & Co., Ltd., and the Birmingham Electric Supply Department

Industrial Activity

This country was unduly modest, but at the moment there were more people earning their living than at any previous time in its history. We must not forget, however, that there were still two million unemployed and he hoped that next Tuesday's statistics would show a figure below the two-million mark. The quarterly statistics published in the *Board of Trade Journal* made it clear that at this moment the rate of production was the highest in our history. He was one of those people who thought that the only way of increasing trade was by raising the standard of living of the people. He had no patience with National Recovery Acts.

For over a hundred years it had been of more economic advantage to sell to foreigners than to one's own people. There was, however, no intrinsic merit in export trade. So long as the goods were sold it didn't matter to whom they were sold. Ninety per cent. of the people in this country in the manufacturing industry were making goods for use in this country. The most notable feature of last year's export trade was the growth of Empire purchases. A year ago it was the practice of confirmed pessimists to state that the market had reached saturation point. He himself had never believed this. There was no limit to the consuming capacity of the people or to the scope of expansion.

Referring to Mr. E. E. Hoadley's speech at the Fair on Tuesday last week regarding the necessity for further co-operation in the electrical industry, Mr. Williams intimated that the high organisation of the gas industry might be copied with advantage. The electrical industry had not that one unity of thought that it should have, but at the forthcoming National Electrical Convention it would have a chance of showing a united front.

Criticism often appeared in the lay Press that the electrical industry had not made so much progress as it should have done. The fact that the cost of a candle power of light had been reduced to a thirteenth of what it was when he first entered the electrical industry, rather gave the lie to this. The slowness of development in rural electrification also often came in for criticism. There was no undertaking in which the initial charges were so high and the rate of progress was quickening.

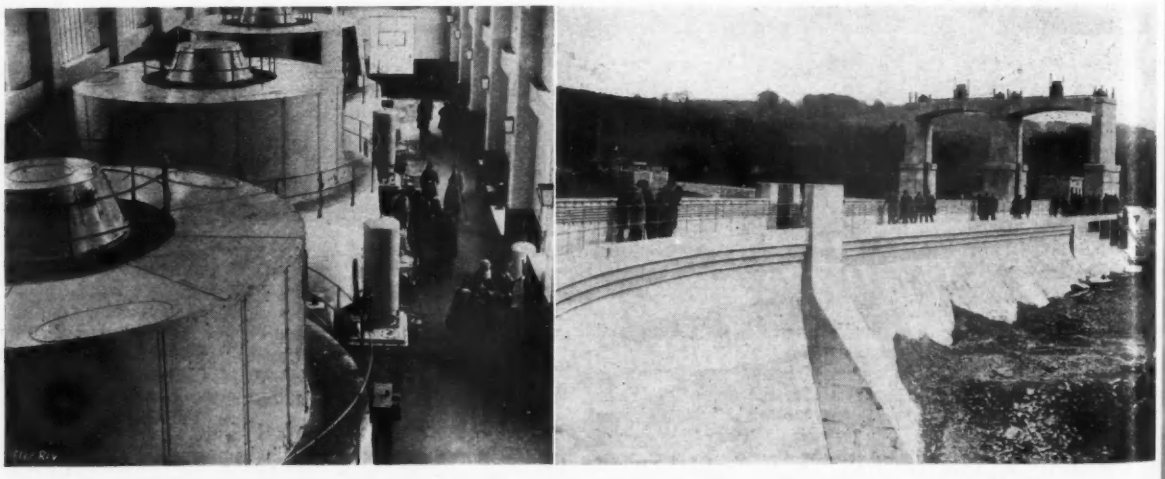
Col. Colville, Parliamentary Secretary to the D.O.T., said the great national character of the Fair was recognised. Published statistics showed that the electricity production of authorised undertakers had increased from 10,294 million kWh in 1929 to 15,495 million kWh in 1934, a 14 per cent. increase in production having occurred during the last year.

In 1934 the estimated production of the five principal countries reached the following percentages of the 1929 figures: United States, 93; Germany, 99; France, 110; Canada, 118; and Great Britain, 129. Electricity production was a good indication of the country's progress. Last year exports had increased by £30,000,000—mostly to Empire countries. The B.I.F. was doing a great national work but there was still more work to be done and we must not be complacent with regard to the future.

More Co-operation

Mr. H. Marryat, president of the Electrical Contractors' Association, said that to judge the real state of the industry we must look at the turnover of the business. Industry had progressed at a very rapid rate, but individuals had not advanced to the same extent. He was looking to the Bournemouth Convention to bring about a real understanding in the industry; there was no doubt that the feud between the contractors and the supply authorities was coming to an end.

Sir George May, chairman of the Import Duties Advisory Committee, also spoke.

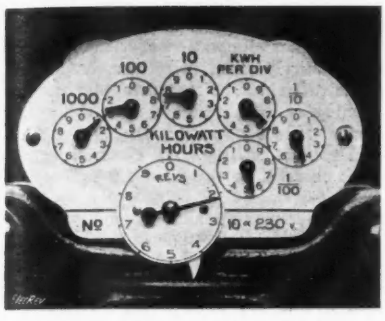


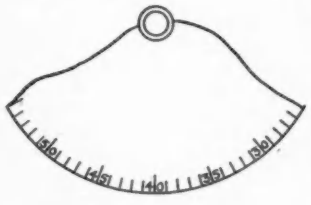
Members of the Glasgow Section of the Electrical Power Engineers' Association recently paid a visit to the Tongland hydro-electric works of the Galloway Water Power Co. Photographs taken on this occasion are reproduced above

A Dual-purpose Meter Register. By G. E. Moore, A.M.I.E.E.

IT is an accepted fact that the ordinary routine testing of integrating meters is best carried out by reference to the register of a rotating sub-standard. The arrangement is convenient and simple, as load variations, due, for example, to system voltage fluctuations, cause no concern. Many results can be immediately interpreted and work expedited.

The integrating sub-standard meter may carry a register which indicates the disc revolutions. This is a form which enables the tester to carry out either short-period tests of a rotating meter by comparing its disc performance with the response of the sub-standard in revolutions, or the vital long-period tests upon the meter's register, by checking its advance with that of the sub-standard, the latter requiring its response to be translated by special constant and calculation into the desired quantity.





Meter with kWh and disc revolution counting dials (left) and a sector of the marked disc

On the other hand one may employ as a sub-standard a "seasoned" commercial type of meter having the ordinary kWh register. With this the comparison of registered quantities is simple, and it is possible to test at significant loads large batches of meters with reasonable expedition and dependability. Short-period disc tests cannot be conveniently carried out by one man (there are ways and means, but they are not attractive) and to employ two testers to "stop-watch" or otherwise compare the disc performances is not an arrangement that can compare with that of one man employing a revolutions sub-standard.

It has been found possible so to modify the second form of sub-standard that both the disc revolutions and the electrical quantity concerned can be read. The modification is in that part of the register train between the disc-spindle and the first (test) dial of the register. One dial is added to the register, and upon this the disc revolutions up to a small amount are shown. Thus, in the example illustrated it will be seen that the main portion of the register indicates kWh by the upper dials; the large single lower dial is marked off for ten disc revolutions.

The disc dial does not by itself suffice, for part revolutions must be accurately read, but a second dial for this purpose could not be imposed upon the train. The alternative was to use the disc itself, this naturally providing (in effect) a very large dial. It was a ready alternative, for the disc already bore 100 equal radial marks at the periphery, intended for stroboscopic tests. Each fifth division was lengthened and numbered; each fifth line (rather than every tenth) was made distinctive in order to facilitate reading off the small portion of the scale that is presented. There is, of course, a fixed index.

It may be thought that ten disc revolutions is a somewhat limited number. This, however, is not the case, whatever the load and whether a revolution-ratio is in use or not, and an experienced tester can exceed this value without difficulty if he wishes, say, to double the run. It may also be felt that variations in the disc material or the existence of an anti-creep device may give rise to uneven torque and hence inaccuracy over part-revolutions, but results have been satisfactory.

Sub-standard meters having the dual-purpose arrangement described are, apart from the temperature compensation, of commercial type. They are fitted with moulded glass covers to make them distinctive (and incidentally more shockproof), while they are extremely economical and reliable. They were made and modified by the British Sangamo Co.

These rotating sub-standards are employed by the Sunderland Corporation electricity undertaking and the foregoing information is published by permission of the general manager, Mr. W. A. Royle, A.M.I.E.E.

The Sliding-scale Tariff. By W. A. Carne, A.M.I.E.E.

Ascertaining the average rate per kWh

MOST engineers are familiar with the type of curve reproduced below which is used to show how the average price in pence per kWh varies with increasing consumptions when the charge is on a sliding-scale basis. Those who have occasion frequently to use these curves realise that the points descend in a series of hyperbolas and that, if hyperbolic paper is used, the curves can be drawn as a series of straight lines. Hyperbolic scales are, however, not readily understood by the average commercial mind and the ordinary curve is usually preferred.

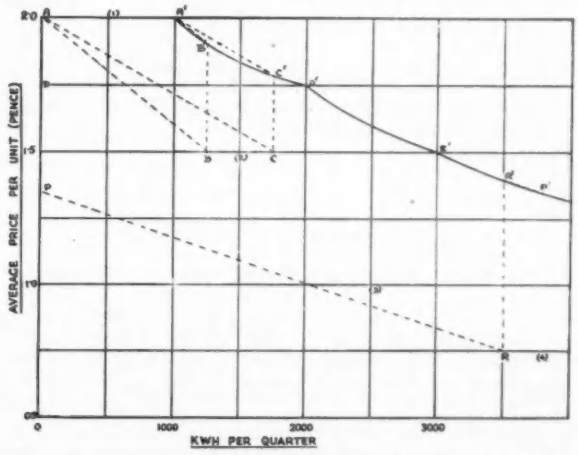
The following graphical construction (which is mathematically correct) enables such curves to be drawn with great rapidity and, provided that a few key points are calculated, with absolute accuracy. Take as an example the sliding scale charge of:—

First	1,000	kWh.	per	quarter	at 2d.	per	kWh.
Next	1,000	,,	,,	,,	at 1½d.	,,	,,
Next	1,000	,,	,,	,,	at 1d.	,,	,,
All over	3,000	,,	,,	,,	at ¾d.	,,	,,

Having prepared the squared paper by marking off the vertical and horizontal scales, draw in the steps of the tariff (1) (2) (3) and (4). From 0-1,000 kWh the average price is 2d. This line A A′ is part of the curve and can be ruled in and forms the base from which further points are geometrically obtained. To obtain a further point on the curve at 1,250 kWh (*i.e.*, 1,000 at 2d.+250 at 1½d.) mark point B at 1,250 on the 1½d. line, join B to A and draw A′ B′ parallel to AB; the point where A′ B′ cuts 1,250 ordinate gives the required point B′ on the curve. To obtain a point at 1,750, mark the point C on the 1½d. line, draw A′ C′ parallel to AC. In this way any number of points between 1,000 and 2,000 kWh can be quickly marked off with the aid of parallel rulers.

The final point D′ at this step of the scale, *i.e.*, at 2,000 kWh should be verified by calculation, as D and D′ are the key points from which are drawn all the points on the succeeding step, *i.e.*, up to 3,000 kWh; this will bring the curve to point E′ which again should be verified.

The method of working is in practice extremely rapid, simple and flexible; for instance from any known point, say P′, further points such as one at 3,500 kWh (R′) on the curve can be marked off (in either direction) as shown in the diagram. None of the construction lines shown need actually be drawn,



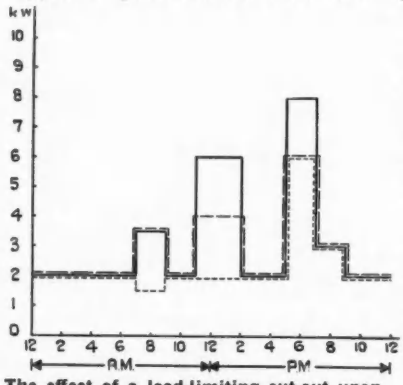
Curves for ascertaining the average price per kWh on a sliding-scale tariff

the points required just being marked off with parallel rulers.

A fixed charge or a kW charge (for any particular load factor) can be added to the tariff without upsetting the principle, provided that a key point is calculated from which a start can be made. The method is also reversible and can be used to derive a sliding-scale tariff to fit in with pre-determined average prices. The mathematical proof is not given as it is fairly simple and may provide an interesting problem for some of your readers.

Regulating Domestic Maximum Demand

AS most supply authorities in this country now purchase their electricity from the Central Electricity Board under a two-part tariff, it is more than ever desirable to give supplies at periods of low load. For large consumers the periods can be controlled by time switches, but for most domestic purposes electricity must be available throughout the twenty-four hours.



The effect of a load-limiting cut-out upon maximum demand

Cut-out set for 2kW m.d.=6kW. Poss. units 73.4 per cent. Cut-out set for 1kW m.d.=6kW. Poss. units 87.0 per cent. Without cut-out m.d.= 8kW. Poss. units 100.0 per cent.

The use of a two-way main switch to disconnect the water-heating elements when the cooker is in use is not altogether satisfactory, because it complicates the house wiring and because the switch may be left in the cooker position when the cooker is not in service.

Unnecessary restriction on the water-heating load can be prevented by the installation of an automatic cut-out which will disconnect the water heater only when the cooking load is above some predetermined limit. The current setting for the cut-out is determined from a study of the diversity factor of all the domestic consumers on the system.

The accompanying theoretical curves illustrate the effect which the introduction of a cut-out has upon the maximum demand of an average house. These curves also indicate that the operating value of the cut-out is of importance, since it may affect the number of kWh used for water heating.

For instance, if the maximum cooker load per consumer is 6 kW and the water heating load 2 kW with a diversity factor of 33 per cent., then the cut-out should function at 1.3 kW of cooker load, up to which point the water heater would be in circuit. With a diversity factor of 50 per cent. the cut-out need not function below a cooker load of 2 kW.

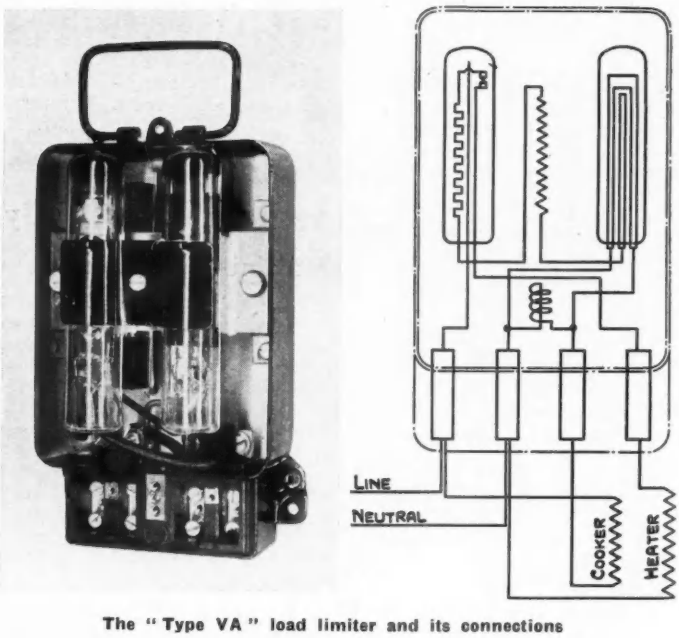
The most important requirements for a cut-out are: Ability to operate at a low load without incurring damage at the maximum possible load; silence in operation; compact design, with terminal arrangements suitable for house-service conditions; ability to break the water-heating load without damage to the contacts; low ratio between pick-up and drop-off values of the current; and low price.

At the request of Mr. P. J. Robinson, city electrical engineer of Liverpool, and with his collaboration, the Metropolitan-Vickers Electrical Co., Ltd. has produced a cut-out to meet these conditions. It is mounted in a small standard house-service meter case with the usual terminal box having a separate sealable cover. Two glass tubes constitute the main parts of the complete cut-out. The tube on the right-hand side is the current measuring device, which consists of an evacuated bi-metal relay; that on the left is the switching device, which is actuated by the application of line potential through the contacts of the current measuring device.

The switching device is a novel design of Sun-Vick vacuum contactor enclosed in an evacuated glass envelope; its contacts are opened and closed in response to the contraction and expansion of a filament of special material which is heated by a minute current from the mains. It is claimed that the contactor is capable of continuous operation over many years without attention and is entirely silent in service, having no electromagnets in its construction. The measuring device consists of a bi-metal thermal relay, also contained in an evacuated glass envelope in order to reduce operating energy and also to ensure freedom from contact trouble. An external shunt, which carries the cooker current, is also used for calibration purposes.

The difference between the pick-up and drop-off value of the current is less than 5 per cent. The cut-out can be mounted beside the usual circuit splitter and does not in any way complicate the house wiring.

The system described avoids the unnecessary cutting out of the water heater. Its disconnection when the cooker load is above a predetermined value is not an undesirable restriction on the use of electricity, since there should be enough thermal storage in the tank to provide hot water during and immediately after the periods of use of the oven. As the functioning of the load-limiting cut-out device depends upon the diversity factor of the combined demands of consumers of the same class, the supply undertaking is safeguarded against any overlapping of the maximum demands of cookers and water-heaters.



The "Type VA" load limiter and its connections

A Guide to the I.E.E. Regulations

THE Association of Supervising Electrical Engineers has issued an "Employee's Guide to the Tenth Edition of the I.E.E. Regulations." This is essentially a simplified form of the Regulations, without most of the cross-references. As it is intended primarily for the use of operatives engaged on installation work, Section 13 of the official publication, which relates to the design and construction of apparatus, has been omitted. The official wording of the clauses (amounting to about half the line space of the original) has been employed where relevant, but a large number of notes and explanatory clauses is inserted in heavier type, and for these the Association takes sole responsibility. A good example of the modifications made is to be found in Regulations 111 to 114 and 207(A) and (B), which deal with protection against excess current; these have been grouped together and entirely reworded with a note that "non-linked" means "single-pole." The section on the testing of installations has been rewritten so as to make the procedure readily understood by wiremen. Other important alterations are No. 704, which relates to the types of motor or generators to be used in special cases, and 706 which deals with the protection of motor circuits. The intervening regulation (705) is replaced by a series of diagrams which demonstrate clearly the various methods of controlling motors. Many further diagrams have been prepared by the Association to indicate graphically the meanings of the terms circuit, final sub-circuit, distribution fuseboard, socket outlet, socket-outlet adaptor and plug, and also cable colours and cable circuits. The term "f.s.c." has been introduced as an abbreviation of final sub-circuit. A diagram of a bell or signalling circuit brings together neatly the leading particulars only to be found in different sections of the Regulations. An index to the current-rating tables will save time and trouble in looking for the tabulated data there presented in so much detail. References to British Standard Specifications have been replaced by the essential particulars, but the graphical symbols extracted from B.S.S. 447-1932 have been retained. The Guide is in a pocket size, and may be purchased from the Association at 1s. in paper covers and 1s. 6d. (cloth).

Ferranti's New Radio Works

OVER five hundred radio dealers and wholesalers from all parts of the British Isles were present at Moston, Manchester, on Wednesday to take part in an official inspection of the new factory which Messrs. Ferranti, Ltd., have just put into service to deal with their rapidly expanding business in the radio market.

For many years past the record of the Ferranti company has been one of outstanding progress, and last season the Hollinwood factory employed over seven thousand workers. The 270,000 sq. ft. of the new building, which the company claims to be the largest and most up to date exclusively radio factory in Europe, will permit the old factory covering fourteen acres to be devoted entirely to heavy products and such domestic appliances as fires, water heaters and clocks.

"Straight-line" Production

The new factory is on one floor only and everything is arranged so that the raw materials enter at one end of the building and progress uniformly to the other end, where they emerge as complete receivers. Before long production will be at the rate of at least a thousand sets a day.

A feature of the organisation is that practically every component required in the manufacture of a radio receiver is produced on the premises. The valve-making section has a capacity five times greater than last year, and includes all the latest manufacturing and testing equipment.

The visitors on Wednesday showed particular interest in the condenser department, where such care has been taken in the manufacture of the apparatus that special air-conditioning plant has been installed to wash and filter the air and to maintain the temperature and humidity of the atmosphere constant all the year round irrespective of general atmospheric conditions.

The cabinet factory is divided into three sections—the cabinet mill, where the raw timber is cut into shape and roughly finished, the assembly shop and the finishing shop, where the cabinets are polished ready for delivery to the receiver assembly department. A very large 750-ton press is used for the manufacture of the two-colour bakelite cabinets which are a feature of the 1935 receivers.

The General Factory

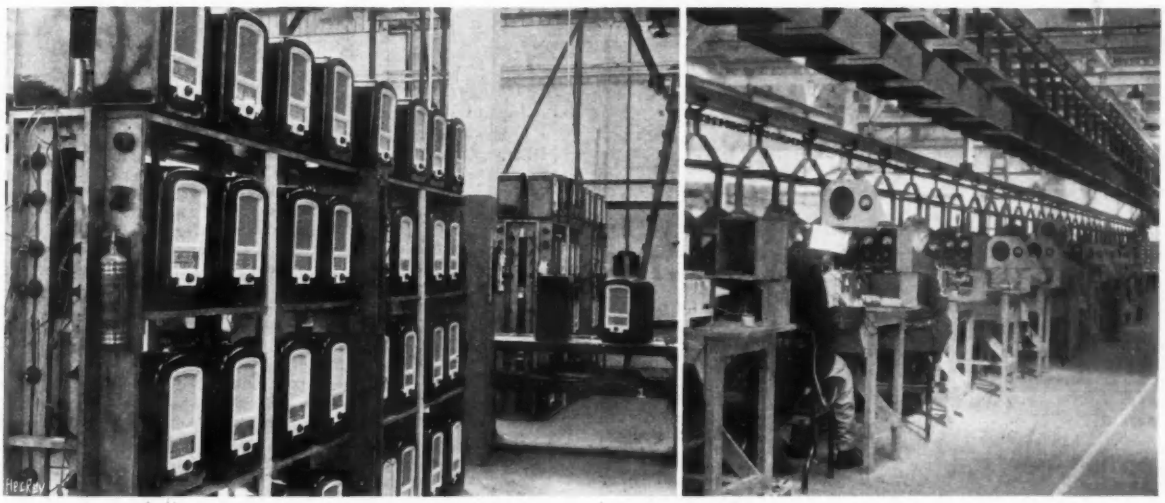
The sections devoted to resistance and component manufacture were first seen on entering the general factory; the visitors then inspected the stores, the machine shop, plating department and loud speaker and main receiver assembly sections. For every particular purpose and every individual part specialised testing gear has been developed.

Throughout the factory all the machinery is electrically driven, and there is no overhead shafting. There is no waste either of space, labour or materials; even the sawdust from the cabinet-making plant and the general factory is used as fuel in the power house.

Recognising that good lighting is essential for good work, the company has taken great pains to provide adequate illumination, both daylight and artificial, the latter totalling 750,000 candle power. The factory's own sub-station supplies electricity to an installation representing over 2,500 h.p.

The care of the employés, of whom there will be over three thousand when the factory is operating at its full capacity, has been a most important consideration of the company, and large canteens have been provided, that for the girls being capable of seating over five hundred Every accepted applicant for work at the factory has to attend the Works Training School on the premises, and must secure a certificate of competence before taking his or her position in one of the many departments.

The visitors were welcomed at lunch by Mr. V. Z. de Ferranti, chairman of the company, and responses were made by Mr. Michael Black, of Glasgow, on behalf of the wholesalers, and by Mr. I. Fielding, chairman of the Wireless Retailers' Association.



Ferranti "Nova" sets on heat run and (right) a view of the testing line

Correspondence

Correspondents should forward their communications as early as possible. No letter can be published unless we have the writer's name and address in our possession

Unauthorised Discounts

There is a parasite finding its way in increasing and alarming numbers into our industry. It is that member of the community who "buys through the trade" without any qualification or trade connection.

In particular I find it most prevalent in the refrigerator trade. It would appear that most ordinary members of the public have a "friend in the wholesale business" who is able to purchase at preferential terms and pass on a part or the whole of the trade discount. The electrical trader is entitled to this discount, in return for which he gives his time and money ungrudgingly in advertising, display and servicing. Often he suffers a loss on the business, for he frequently has to meet severe depreciation either in price reductions or damage to cabinets in stock.

This problem is a real one, and so acute that it calls for immediate action. The solution is in the hands of the manufacturers, although it is the wholesaler who is generally the cause of the trouble. Every refrigerator manufacturer should steadfastly refuse to issue any guarantee whatsoever on any cabinet he makes if the final consignee (in other words the user) does not produce written evidence in the form of an invoice showing that he has paid the full list price.

I feel sure that the manufacturers will agree with me that an intensely bad feeling is being created in the electrical retail business by this unauthorised and unjust granting of discounts.

W. G. NOTTAGE.

Beckenham, *May 22nd.*

Assisted Wiring

It is with interest I note Mr. Phœnix's article on this subject in the ELECTRICAL REVIEW of May 24th.

For four years now we have had two optional schemes of assisted wiring, namely, (1) 2d. extra per kWh; or (2) 1s. 3d. per week plus 2d. per kWh. Consumers can have whichever they prefer. Under the second scheme the payments are collected by the synchronous motor type prepayment meter, and I am entirely in agreement with Mr. Phœnix's remarks.

Spalding, Lincs, *May 25th.*

FRANK R. C. ROBERTS,
Engineer and Manager.
U.D.C. Electricity Department.

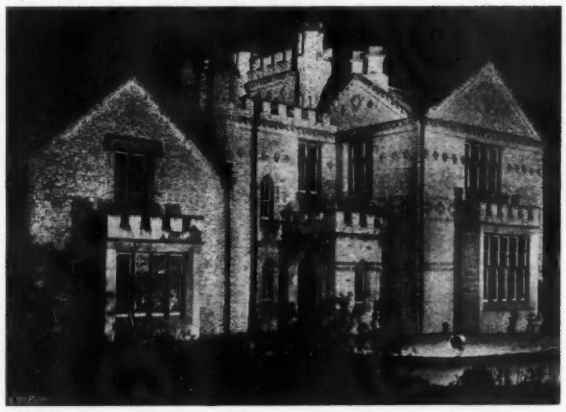
In the Courts

IN the Companies' Court on May 22nd the hearing was commenced before Mr. Justice Crossman of a petition by Marconi's Wireless Telegraph Co., Ltd., Standard Telephones and Cables, Ltd., and the Gramophone Co., Ltd., for a compulsory winding-up order against British Lumophon, Ltd., of Judd Street, W.C., which is in voluntary liquidation. The petition was opposed by the company and the liquidator and by creditors for £5,000.

Mr. G. P. Slade for the petitioners said they were immediate creditors for £618 in respect of royalties due under licence granted to British Lumophon, Ltd., to deal in patents relating to wireless apparatus. The petitioners' case was that the financial history of British Lumophon, Ltd., made it very desirable that there should be a public investigation. For the period between the end of 1930 and the end of 1932 the company paid the enormous dividend of 300 per cent., and yet in May, 1933, it was insolvent to the extent of £6,000.

That was a remarkable circumstance and required investigation because it showed either a reckless distribution of the assets or the payment of a very large dividend at a time when the position of the company did not justify it.

Mr. Slade also criticised the statement of affairs of the company and drew attention to the heavy item of bad and doubtful debts, and also to certain inaccuracies. He said it was a surprising thing that where there was a voluntary liquidation which left nothing for the unsecured creditors



Among the many floodlighting installations carried out by the staff of the Metropolitan-Vickers Electrical Co., Ltd. (employing "Cosmos" lamps) is Irlam Old Hall, illustrated above

six creditors for £5,000 should come forward and offer such strenuous opposition to a compulsory winding-up order.

The hearing was continued on May 23rd. After evidence had been given, Mr. Syres, for the company and the voluntary liquidator, and Mr. Lindon, for the opposing creditors, agreed that there must be a full investigation into the affairs of the company, but submitted that that could be done equally well and much cheaper by the voluntary liquidator than by the Court.

The case concluded on Friday last when his Lordship held that the petitioners had made out a case for a compulsory winding up order, and an order was made accordingly.

"Malicious Mischief" Charge Dismissed

After a trial lasting two days before Lord Kinross, K.C., Sheriff Principal of Dumfries and Galloway, and a jury at Dumfries, Geoffrey Victor Vaughan and Alexander Dobie, two officials of the Stewartry County Council Electricity Department, who had been indicted on a charge in connection with the failure of the electric light at Dalbeattie on January 31st, 1934, were by the unanimous verdict of the jury found not guilty of malicious mischief, to which offence the charge was reduced in the course of the proceedings. The two men were discharged.

The charge stated that they did "unlawfully and maliciously cut or injure an electric line, the property of the Stewartry County Council, as local authority authorised to supply electricity within the area of the county of the Stewartry, including the burgh of Dalbeattie." Cross-examination for the defence of witnesses for the prosecution was directed to show that the cable in question was not part of the undertaking of the County Council, and the whole course of the trial was changed when evidence was given by the County Clerk. He stated that the cable was part of the property of the old company, and was not part of the "authorised undertaking" which the County Council had powers to carry on. He stated further that in September last he expressed to the Procurator Fiscal the opinion that a charge under the 1882 Electricity Act would not be competent, as the Dalbeattie works were not part of the authorised undertaking at the time of the alleged offence.

When the case for the Crown was concluded Mr. King Murray, K.C., for Vaughan, submitted there were no facts which would justify the jury in holding that any part of the "authorised undertaking" of the County Council had been injured. He claimed that the indictment was no longer valid, since what he had submitted was clearly established by the only witness competent to deal with the matter. The Advocate Depute, Mr. J. C. Guy, said there was still a perfectly good charge of malicious mischief. Lord Kinross sustained Mr. King Murray's objection, and the indictment was accordingly amended, reducing the charge to one of "unlawfully and maliciously cutting or injuring an electric line, the property of the County Council."

In the course of the evidence allegations were made by former employés of the County Council's Electricity Department, one of whom alleged that he had been dismissed because he would not carry out instructions that he honestly felt were not his duty. These instructions, he alleged, were to increase the voltage and destroy consumers' apparatus, with the object of "sickening" the consumers of the old supply, as they were slow in changing over in Dalbeattie from the d.c. system to the new method. The evidence for the defence was confined to that of character, witnesses speaking of the high opinion they had formed of the two accused. Mr. King Murray, in his address to the jury, described the prosecution as "an ill-starred and ill-considered" one, and counsel for Dobie said it was incredible that these two men should cut a cable belonging to their employers and inconvenience the public for no reason whatever and with no advantage to themselves in any way.

Claim for Radiograms

In the High Court on Monday last Sir Francis Newbolt, K.C., the Official Referee, delivered a reserved judgment in an action brought by Clarendon Radio, Ltd., Willesden, to recover £188 16s. 10d., the balance of the price of ten radiogramophones and twenty-seven table models from Messrs. Nutter, Son, & Edge, Ltd., Salford.

The contract for the goods provided that if the apparatus did not conform to contract the buyers (the defendants) could reject it, which they did, and the question which the Official Referee had to decide was whether the goods were of merchantable quality, up to standard, and fit for the purpose intended.

After a three days' trial the Official Referee held in favour of the defendants that the goods did not conform to contract and that they were entitled to reject them and he accordingly dismissed the plaintiffs' claim with costs.

An application for a stay of execution with a view to an appeal by the plaintiffs from the judgment was refused.

Parliamentary News (BY OUR SPECIAL REPORTER)

THE Select Committee of the House of Commons on Unopposed Bills, presided over by Capt. R. C. Bourne, had before it on May 23rd a Bill promoted to confirm a Ministry of Transport Order authorising the working of trolley vehicles by Portsmouth Corporation. It is proposed to extend the existing tramway by means of trolley vehicles along Northern Parade and also to provide a service of trolley vehicles along Northern Road, Cosham, and London Road, Cosham. Power is given to the Corporation to borrow £8,000 (repayable in ten years) for the provision of trolley vehicles and £5,300 (repayable in fifteen years) for equipment and the necessary works. After formal evidence the Bill was ordered to be reported for third reading.

Trolley Buses in Newcastle

Included in the General Powers Bill promoted by the Newcastle-on-Tyne Corporation which was considered on May 23rd by the House of Commons Committee on Unopposed Bills, are clauses authorising the Corporation to work trolley vehicles as part of its transport undertaking. It is proposed to start by running trolley vehicles on about ten miles of route in the city and provision is made in the Bill for the extension of the system to other routes in the city subject to the consent of the Ministry of Transport. The Committee approved the proposal and ordered the Bill to be reported to the House for third reading.

Railway Electrification

On May 22nd Mr. Chorlton asked the Minister of Transport if the railway companies concerned had yet prepared any combined scheme for the electrification of the railways of South Lancashire, the adjacent industrial districts, and the West Riding of Yorkshire; and, if not, would he take steps to assist the commencement of this improvement as an economical means of affording employment.

Mr. Hore-Belisha said that this was not a matter in which he had any power, but he understood that the railway companies had not yet prepared any such scheme.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

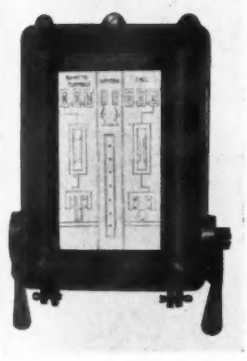
An Infra-red Ray Generator

An advantage of the new "Discus" infra-red ray generator is that treatment can be administered very close to the patient's skin without danger of burning, as the emission is of exceptionally long wave-length. A 400-W circular element is situated in a 13½-in. parabolic reflector. Vertical and full angular adjustments are provided and the whole is mounted on a four-legged base. The MEDICAL SUPPLY ASSOCIATION, LTD., 167, Gray's Inn Road, London, W.C.1, states that the emission ranges from approximately 20,000 A.u. to 160,000 A.u. with a peak at 50,000. There is a "Minor" unit which is a simplified and lower-priced edition of the larger model. The essential principles are the same but height adjustment is obtained by telescopic action, and there is a special swivelling arrangement at the top of the upright which guards against the dropping of the reflector and makes it impossible to damage the latter against the upright when it is fully lowered.

The "Discus" infra-red ray generator

Combined Switch and Distribution Board

A 230-V main switch which includes within the same cover the fuses controlling the circuits for different domestic uses is being placed on the market by MESSRS. F. W. F. & SON, White Lund, Morecambe. At the bottom of the case on each side is a 30-A single-pole switch interlocked with the cover. Each switch feeds three 30-A fuses for heavier domestic supplies, and there is also a 10-A single-pole two-way draw switch and fuse for lighting. An insulated bar is fixed vertically in the middle of the lower portion of the box, and there are no fuses in the neutral wire. A diagram of the connections is shown in the cover. The switch is designed with especial reference to the requirements of the all-electric house supplied under a two-part tariff in which energy for all purposes is provided at the same running cost.



The F.W.F. switch-distribution board

Osram Radio Valves

Two new radio receiver valves have just been introduced by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. One is a new type of frequency changer for a.c. mains sets (Osram X.41), which is a combination of hexode detector and triode oscillator in the same bulb, and fitted with an indirectly heated cathode. The hexode consists of the control grid (with variable mu characteristics), screen grid, mixer grid, another screen grid, and the anode. The two screen grids are connected together. In the valve the grid of the triode section is connected to the mixer grid internally so that oscillations generated by the triode modulate the hexode cathode stream.

It is claimed that there is almost complete absence of interaction between the oscillator and detector sections, and a high mutual conductance in the triode section which simplifies coil design and prevents uneven oscillation.

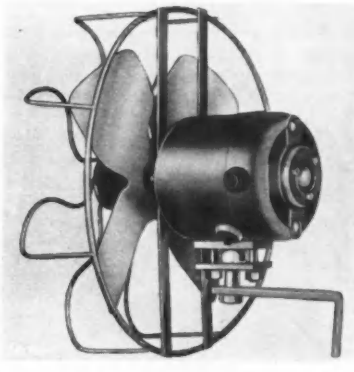
The second newcomer is a triode hexode valve (X.31) which is similar in general characteristics to the a.c. mains triode hexode type X.41 recently announced, but is in the 0.3-A universal a.c./d.c. series. In common with the X.41 it offers material benefit in adaptability to short-wave reception without "frequency pulling," high conversion gain, and almost complete absence of interaction between triode and hexode sections. The X.41 has a filament voltage of 4 V and takes 1.2 A, the rating of the X.31 being 13 V and 0.3 A.

A Fan for Motor Cars

With the growth in popularity of saloon cars, there has arisen a market for fans which can be operated inside the car. The occupant is thus able to enjoy a cooling draught of air from the required direction.

The new "Comfortair" fan (KLAXON, LTD., 36, Blandford Street, London, W.1) is a four-bladed fan 6½ in. in diameter, driven off the 12 or 24 V car accumulator. When running at 2,100 r.p.m. the air displacement is claimed to be 451 cu. ft. per minute and the velocity at 1½ in. radius is 812 ft. per minute.

The same design of fan can also be obtained with a motor wound for use on standard mains voltages.

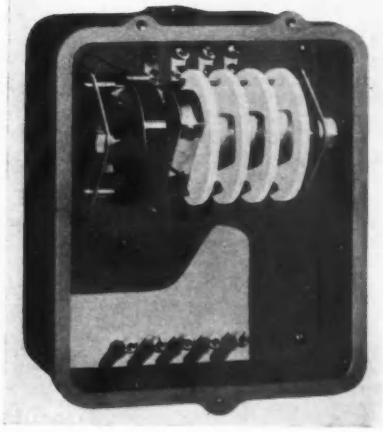


The "Comfortair" fan

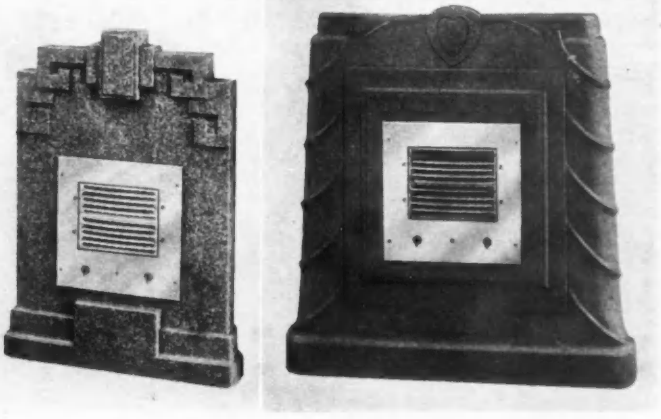
A Multi-purpose Relay

The "Sharborn Relay" is designed for use as a relay, contactor, circuit-breaker, or remote-controlled switch. It can be operated manually; by press buttons; by two-way switch with single- or double-impulse wires; by thermostatic, hygroscopic or float controls; or by time switch. Any number of relays can be connected in cascade for the control of lighting from a central point, one impulse wire only being required from the latter to the first relay of the series; a pilot lamp indicates when all lamps are on.

The type illustrated is the standard triple-pole 25-A barrel switch, which can be adapted for one, two or three single poles or for double-pole operation. The metal contacts are mounted on steatite blocks, with flame guards of the same material, the whole being assembled on a spindle to one end of which the armature of the oscillating magnetic device used in the relay is attached.



Standard triple-pole "Sharborn Relay"



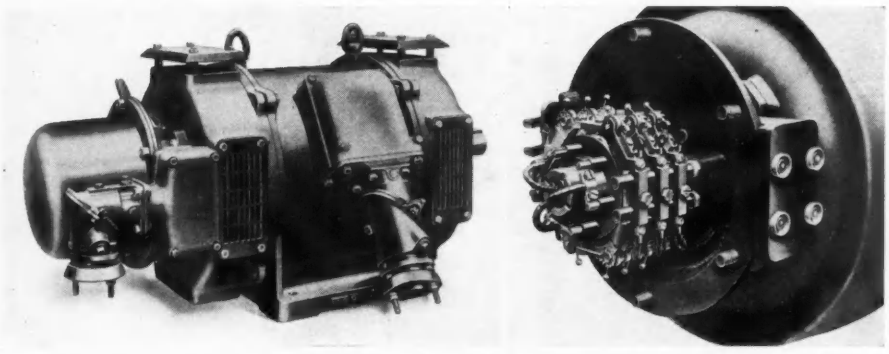
Two new fireplaces made by the Leeds Fireclay Co., Ltd., Wortley, Leeds

Current-carrying parts, and screws and terminals, are of nickel-plated brass. The unit can be supplied for incorpora-

tion in switchboards or enclosed in a cast-iron water-tight case. The electro-magnetic mechanism consists of a fixed field, and the operating portion of the oscillating armature is energised only during the period of transit between the "off" and "on" positions (about 0.04 sec.). It is required only to make circuit, the break occurring in the relay itself. The relay can be wound for usual voltages on a.c. or d.c. systems. At 380 to 500-V three-phase the operating circuit is connected between one-phase and neutral. The relay is manufactured by MESSRS. OSBORN & SHARP, 18, Gibson Street, Glasgow, W.2.

Electric Fans

MESSRS. SIEMENS ELECTRIC LAMPS & SUPPLIES, LTD., 38/39, Upper Thames Street, London, E.C.4, announce that this year their entire range of a.c. fans is fitted with induction motors which, on account of non-interference with radio reception, silent running, and better all-round performance, are preferable to the a.c. series commutator type. The prices of the more popular types of fans have been reduced.



A 45-h.p., 975-r.p.m., screen-protected motor, with dust-tight, slip-ring enclosure, and (right), flameproof collector gear for continuous running which is unaffected by severe vibration

A Bedside Lamp

A neat bedside lamp available in thirty-two different colours and in fine tortoiseshell has been sent to us by MESSRS. CRAYONNE, LTD., St. Bernard's Works, Bexley. It is nine inches high and has a new design of screw-on shade, all the fittings being plated. The control is by means of a pear switch situated in the flex.

"Crayonne," the material of which the lamp is made, is claimed to be unbreakable, non-inflammable and pliable: it does not chip and can be washed easily.

It is translucent and in the tortoiseshell colour presents a very cheerful appearance whether the lamp is on or off.

The Crayonne "Milady" bedside lamp

School Laboratory Instruments

A new range of ammeters and voltmeters has been introduced by MESSRS. CROMPTON PARKINSON, LTD., Bush House, London, W.C.2, for school laboratory bench use. The "S.K." moving-iron type is for a.c. or d.c. circuits, and the "S" moving-coil type for d.c. only. The movements of the first are of the repulsion class fitted with mumetal elements and pneumatic damping. The moving-coil type has a cobalt-steel magnet with damping by eddy currents induced in the aluminium former on which the moving-coil is wound. In both types the moving parts are mounted on hardened steel pivots working in sapphire bearings.

Spade pointers are normally supplied, but knife-edge ones can be fitted. The damping period is one second when tested in accordance with B.S.S. No. 89, and it is claimed that the instruments can withstand overloads up to ten times full scale. Both types of movement are magnetically controlled, shielded, balanced for any position, and provided with a screw-operated zero adjuster. The scales are 4in. long, with markings from one-tenth of the maximum scale value. The divisions are even for the moving-coil and almost even above one-fifth of full scale for the moving-iron instruments. Dials and movements are mounted in inclined oak cases with the planes of the dials 60 deg. from the horizontal. Accuracy is first grade (B.S.S. 89), but this applies to moving iron voltmeters only when they are used on the type of supply for which they are calibrated.

One of the new Crompton Parkinson school laboratory instruments

A.c. Mining Motors

A range of general purpose a.c. mining motors is being produced by the BRITISH THOMSON-HOUSTON CO., LTD., Rugby, for either surface or underground service in coal mines, where complete flameproof enclosure is not demanded. Squirrel-cage and slip-ring motors up to about 50 h.p. at 1,000 r.p.m can be supplied.

The machines have been designed to work in damp and dusty situations, and where the duty imposes severe vibration. It has also been borne in mind that they have frequently to be installed in inaccessible positions where supervision and maintenance are difficult.

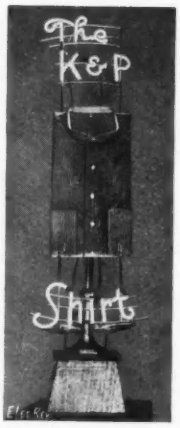
Squirrel-cage motors can be employed for most drives, including pumps, compressors, fans, conveyors, and screening plant, as there is usually no objection to switching them direct on to the mains. When considerable starting effort is required a "high-torque" motor can be provided.

Slip-ring motors are necessary where high starting torque is required with minimum current or where the acceleration must be gradual, such as for ram pumps and compressors with considerable frication and inertia, or for haulages, fans and pumps when speed control is required. The motors have brushgear which is unaffected by vibration, and is enclosed in a dustproof cover. A flame-proof enclosure is available, which is covered by the Mines Department's Buxton certificate.

A Useful Showroom Fitting

Managers of electrical and other showrooms will welcome a device recently put on the market by MESSRS. ARTHUR SCHMERL, 23, Foscot Road, Hendon, N.W.4, to enable goods to be displayed close up to the glass shop front at eye level. It is constructed on the same principle as a suction automobile licence holder, and when affixed to the window is capable of sustaining quite heavy weights. As will be observed from our illustration, the circular space within the fitting may be used for displaying the price of the article shown. This device can be usefully employed to emphasise special improvements in small apparatus.

A kettle mounted on the Schmerl suction holder



An unusual neon window sign produced by the Glow-lite Transformer Company, London

"Gramovision"

A development of television which has been named "Gramovision" was recently demonstrated at Messrs. Selfridge's store, Oxford Street. Picture records are made by almost the same system as that used for making ordinary gramophone sound discs, by means of indentation.

Reproduction is achieved with the aid of a conventional turn-table and electrical pick-up coupled to the amplifying portion of an ordinary radio receiver which is suitably connected to a television receiver.

It is claimed that "Gramovision" will reduce the expense entailed in the provision of special transmitters for radiating television for radio broadcasting stations. A standard gramophone disc suffices for the accommodation of thirty-line pictures lasting six minutes on either side, although larger records can be made.

The records are sold at 7s. each, and the inventor is MR. F. PLEW, 10, Christopher Place, Wigmore Street, London, W.1.

A New Publicity Outlook. By F. R. Jervis, B.Com.

THE electricity industry in its relation to competitors, suffers from two main defects: either it blandly ignores as non-existent its main competitor, the gas industry, or it recognises it only to decry its product, its methods and the stupidity of the public which continues to patronise it. The publicity for electricity consequently suffers from the same imperfections.

All too often the consumer is urged to use electricity for various purposes as the only way in which his wants may be satisfied. But practically always these same wants may be satisfied by gas, and in a good many other cases there are other possible sources of supply and satisfaction. It is insufficient for electrical people to believe that the consumer's needs are catered for by the use of electricity (everyone believes in his own industry), for this view is not shared by people in the gas industry—nor is it evidently shared by the general public, or why is any other agent employed for heating, lighting and power?

[*Wright & Logan, Southsea*
Mr. F. R. Jervis

One result of this is that the consumer is offered the choice of the latest and most efficient electrical apparatus in contrast with the oldest and most out-of-date gas apparatus. He, or as is generally the case, she, is confronted with an advertisement, poster or staged play, showing the advantages of the all-enamelled electric cooker over a 1900 vintage gas stove which must have been used by the most untidy and laziest woman in the United Kingdom; or how much more convenient is electricity over a prehistoric wood fire. If she uses either of these possible cooking methods, it is obviously to her advantage to change over to electricity.

On the other hand if she has a 1935 gas stove, her natural feeling is that the publicity does not apply to her; it must apply to the old-fashioned woman next door. Attractive vitreous enamel is to be seen on other domestic apparatus than electric cookers. What is the use of telling madam that electricity saves her matches if she has installed in her home the latest type of gas cookers and gas fires?

E.D.A. has issued an attractive calendar showing the progress of lighting through the ages, from the Stone Age to the future. Admittedly there are only twelve months to the year so that the various stages of man's development are in strong competition for a place in the gallery; that is, perhaps, the reason why there is no mention of gas lighting—not even in a historical way.

A greater fault, however, is to attempt to gain electrical consumers by running down gas. A consumer who for years has used gas to her complete satisfaction will be distinctly annoyed if she is told that she has been fooling herself all this time. It is human nature to do foolish things; it is equally human nature to resent strongly one's lapses from perfection being pointed out or ridiculed. If one of her illusions is thus shattered and she looks for faults in her existing methods, she is likely to notice disadvantages in the proposed new method. To make a prospective consumer suspicious of competitors is to make her generally suspicious; a suspicious prospect is not in the right frame of mind to be sold anything.

Moreover, electrical engineers who live in an atmosphere of electricity will quite obviously be "electrically minded." Unconsciously, therefore, they will feel that there is no other possible source of light or power. They may not actually tell the consumers this in so many words, but it will influence their outlook and actions. They are so impressed with the merits of electricity that they will feel that no business acumen nor energy are required on their part. "Electricity sells itself" on its own merits they consider.

The gas industry, like any other industry, advertises its product and its service; it is unjust as well as bad business to hold the opinion that electrical advertising is to benefit the public, while gas advertising is an attempt to mislead them. All industries have their own methods of gaining business. Competitors should not decry those methods but should attempt to introduce better ones.

More Competitors than One

Gas is not the only competitor of electricity. The choice is not always between the gas stove and the electric cooker, but often between the art of cooking and the tin-opener. All the alternative ways in which a person may spend his money are in strong competition with each other to gain the consumers' favour. Each industry must stand on its own feet whether it has direct competitors or not. Probably in no industry is competition more keen than in the market for motor cars. Yet we do not see the maker of car "A" attempting to show the public the folly of purchasing car "B" or car "C." What he does try to show is the specific reason why car "A" will exactly satisfy the motorist's needs. Cars "B" and "C" are very good, but car "A" is just that little bit better.

The same spirit should be apparent in electrical advertising. It is not only necessary to sell the idea of having constant hot water on tap, because people can have constant hot water without the aid of electricity; it is imperative to sell the idea of using electricity for constant hot water. And the consumer must be told why electricity is better than the other methods, not that the other methods do not exist. Of recent months there has been noticed a considerable amount of attractive propaganda for various methods of utilising direct fuel for cooking and water heating. There are more competitors than one, none of whom is to be despised or ignored.

Engineers and Salesmen. By "Interested"

How the consumer suffers through lack of co-operation

AN observer need not look very hard to discover that the supply industry suffers as a whole from what is undoubtedly a lack of co-operation between the supply and sales organisations of a number of undertakings, and a little further reflection would indicate that this state of affairs must necessarily react upon the consumer. Destructive criticism being useless, it is proposed to examine the existing situation, and with due deference submit what is hoped are constructive suggestions for improving the position.

Perhaps the best method of approach is to group the points to be considered under the headings of mains development, services, and rates of supply, omitting the delicate question of why undertakings in general adopt individual methods, instead of combining ideas on the multi-shop principle, with a resultant pooling of available resources and consequent increase in general efficiency.

Mains Development

On first thoughts several pertinent questions appear to require attention, such as how many supply men treat their sales colleagues as engineers and fully discuss with them the technical considerations involved in laying out a new estate for cable development? Or how many supply engineers have discovered to the shareholders' cost (and later to the consumers') that their original estimate of the probable load in five years' time is moonshine, resulting in the area having either to be provided with heavier cables, or, alternatively, expensive boosting arrangements adopted? A conference with the sales engineer would have in all likelihood enabled a much closer estimate to be made of the probable load from the estate concerned, with a considerable saving of expense.

Any question affecting the technical layout of an area is, of course, solely the supply engineer's domain, but, unfortunately, it still has to be learnt by some of the older "die-hards" that sales engineers possess an invaluable knowledge of the probable requirements.

Another important matter is the question of permissible voltage drop. Engineers are fully aware of the Commissioners' Regulations, but it should be more fully appreciated by the supply man that the consumers are far from satisfied with cooking times as quoted by the sales staff if they chance to be situated in supply areas where full advantage is taken of the limit allowed. Buying a kettle to boil in (say) five minutes, and then finding it takes nine, does not increase a consumer's desire to do further business with the supply authority, and any shortsightedness on the part of the supply engineer reacts on his sales colleague to an

extent which is not always so fully realised as it should be.

There is still a form of trouble that particularly annoys consumers and sales people alike, and that is the necessity to pay what is impudently called a "service" charge. The more progressive electricity committees have dropped this imposition, but there are still large numbers of authorities requesting consumers to pay for the privilege of having the undertaking's cable laid to the premises concerned before being able to avail themselves of the "public" supply facilities offered.

Many wiring orders are lost because of the irritation felt by the consumer at this imposition initiated by the supply engineer. Obviously, as some authorities have already waived this charge, it can be done, and if the public had their way it *would* be done.

Another form of irritant is for consumers who accept an estimate from the sales engineer for using more electricity to find that, due to the smallness of a service cable laid ten years ago, they have to pay an extra charge for a larger replacement cable to be installed. How satisfied these consumers must feel, and what an encouragement to "Use more Electricity"!

Rates of Supply

The question of methods of charging is probably one of the most awkward matters to settle between sales and supply staffs, and it is one that reacts on the consumer. How many times does a sales representative fail to sell electrical apparatus because a suitable rate of supply is unavailable? It is an old question and is still raised daily in more showrooms than is good for the industry. Surely the limitation of supply imposed by some authorities on water-heating installations that touch the "peak" can be lifted. If this is considered impossible, the consumer asks why the cooker allowed is indiscriminate supply at nearly the same rate. Are the 2-kW kettle and 2-kW hot-plate better than a 4-kW immersion heater? The answer is possibly diversity, but what sales engineer can explain "diversity" to the hairdresser who, wishing to install an electric hot-water system using the cheap "follow-on" tariff finds this disallowed because it touches the "peak"?

Surely if the sales and supply engineers co-operated in the matter of rates of supply, tariffs could be evolved suitable to the authority but still covering the consumer's particular requirements, of which the sales representative has an intimate knowledge. Many instances must occur where the sale of electrical apparatus is dependent on a suitable tariff to convince the consumer that it is an economical proposition.

I hope I have made it clear that it is desirable to foster more co-operation, and that the consumer would benefit to a considerable extent if the few criticisms outlined were more fully considered in their entirety.

New Books

The Measurement of Inductance, Capacitance, and Frequency. By A. CAMPBELL and E. C. CHILDS. Pp. 488; figs. 453. London: MacMillan & Co. Price 30s.

The title of this book is perhaps the feature most open to criticism, simply because it fails to indicate the scope of the ground covered by the authors. In addition to the subject of the measurement of inductance, capacitance and frequency, and the relevant subjects of sources of test current and measuring and detecting instruments, there are included valuable sections on the design and construction of resistances, inductances, mutual inductors and condensers, and on a.c. potentiometers. The book is therefore a comprehensive treatise covering nearly the whole ground comprised in the designation of a.c. laboratory testing.

The theory of the various methods of testing described, as well as that of the vibration galvanometer and of a.c. networks, is concisely presented, and the mathematics should be easily readable by students of average equipment. The notes on actual testing procedure are quite practical in tone, while the frequent historical references add materially to the general interest of the book. The section on frequency measurement includes descriptions of commercial frequency meters.

The weakest section is that dealing with the testing of instrument transformers. This is too wide a subject to be adequately treated in the meagre space of five pages which the authors have allowed themselves, and they have been obliged to omit references to the many workshop comparison methods of testing which have been developed during recent years. In the next edition of this work the chapter on transformer testing might well be either amplified or omitted. The mention of the use of an a.c. potentiometer is rather misleading to students, as it is very doubtful whether this method would be used by a practical man.

In the preface the authors express regret that they have not felt able to adopt simplified spelling. They might have gone so far in this direction as to avoid the use of "resister" and "inductor" in one sentence. The book has been skilfully written, and it is copiously illustrated. It is deserving of high commendation, and it will undoubtedly take a foremost place in engineering literature as a first-class work of reference.

Normalisations, Spécifications et Règles Techniques. Pp. 1370; illus. Paris: Union des Syndicats de l'Electricité.

Prior to 1929, the French Union des Syndicats de l'Electricité published annually a complete collection of French rules concerning the construction of electrical material and the execution of installations, in a single volume. The bulk of the material then became so great that the present form of publication was adopted, *viz.*, two volumes, revised in alternate years, and dealing one with administrative, legislative and statistical matters, the other with standardisation, specifications and technical rules.

The work now before us is the technical volume for the years 1934-35. It consists mainly of twenty-nine publications ratified by the Comité Supérieur de Normalisation (seven of them new or modified since the 1932-33 edition appeared), and thirty-five publications (fourteen new ones) issued by the Union des Syndicats de l'Electricité. The general form of these publications resembles that of the British Standard Specifications, and their scope covers the principal electrical materials and equipment, and a variety of installations.

Other sections include the rules of the Chambre Syndicale des Constructeurs de Gros Matériel Electrique on the standardisation of electrical machinery, the rules of the Hydrotechnical Society of France concerning hydro-electric equipment, and official regulations relating to the distribution of electrical energy, electricity meters, and radio interference. The section on the protection of broadcast receivers against interference appears for the first time in this edition. It contains a list of possible sources of interference, and should be read in conjunction with publication No. 42 of the Union des Syndicats, which was issued after the present volume went to press.

A section of nearly 100 pages is devoted to a concise statement of the conditions applying to the use of the U.S.E. "mark of quality," and a full list of the firms entitled to use it on stated products. The range of products to which the mark is applicable is to be extended. The advertisers' section is a valuable feature of the volume.

Die Elektrizitätstarife (Third edition.) By G. SIEGEL and H. NISSEL. Pp. 318; figs. 54. Berlin: Julius Springer. Price Rm. 28.50.

This important volume is described as the third edition of the work originally published under the title "Verkauf elektrischer Arbeit." It has been so thoroughly revised and modified in scope that it might almost rank as a new work were it not that continuity with the earlier editions is completely established by important sections in which Dr. Siegel originally wrote as a pioneer. He now points out, with well-justified satisfaction, that the principles of tariff-framing laid down in the earlier editions still hold good; and, in particular, current practice endorses his opinion that "service value" to consumers is as important a consideration as the total cost of generation plus a reasonable margin for profit and reserve. The balance between supply and demand depends as much on what the consumer can pay and what electricity is worth to him as it does on the cost of production. Maximum development of load on the one hand, and satisfactory financial return on the other hand, depend upon the correct appreciation and application of the principles developed in the first part of this book.

After dealing thoroughly with the economic and technical bases of tariff framing, the authors explain fully the different types of tariffs in use, illustrating the effects of each and presenting concise statements of the various tariffs used in twenty-two countries. This section is exceptionally interesting and valuable. The main body of the book concludes with a constructive section on the standardisation of tariffs, but special mention must be made of the useful appendices, including indexes which enable examples of any particular type of tariffs to be found quickly; a very extensive bibliography; and a folding chart for the conversion of currencies. The whole book is thoroughly in line with tariff facts, policies and problems as they exist to-day, and it should contribute materially to the sound and rapid development of electricity supply.

* * *

Shorter Notices

"The Slide Rule." By C. N. Pickworth. Pp. 125; figs. 39. London: Emmott & Co., Ltd., and Pitman & Sons, Ltd. Price 3s. 6d. The twentieth edition of this practical hand-book deals as before with the principles upon which slide-rule calculations are based, and it contains a large number of examples illustrative of the uses to which the slide rule may be put. A chapter on recent developments in design contains an explanation of the differential scales recently devised to extend the scope of trigonometrical calculations.

"Diesel Locomotives and Railcars." By B. Reed. Pp. 190; figs. 131. London: Locomotive Publishing Co., Ltd. Price 6s.

"Photo-Electric and Selenium Cells." By T. J. Fielding. Pp. 140; figs. 74. London: Chapman & Hall, Ltd. Price 6s.

New Bournemouth Showrooms

ELECTRIC House, Bournemouth, the new showrooms of the Bournemouth and Poole Electricity Supply Co., Ltd., is worth a visit by delegates to next week's Convention. It is a four-storey building of steel and Bath and Portland stone, and at the first floor level, along the whole length, is a parapet specially constructed for housing and concealing the floodlighting projectors. From the main entrance one enters a spacious lounge, panelled in Cuban mahogany, at the end of which is a cashier's counter. An extension of this floor in the other direction is the ground sales floor at the end of which is a sales counter for lamps and sundries. Below there is the lower ground sales floor, and we congratulate the company on the success of its efforts to make this look quite unlike a basement. On both sales floors the company has endeavoured to show each piece of apparatus in a suitable setting. A demonstration room which will accommodate fifty persons opens off the lower sales floor by folding doors, so that it can be used as an extension to the sales floor. The electrical interest of this building is increased by its thermal storage heating installation. Hot-water radiators and embedded panels in separate parts of the building are served by a 2,240-gal. storage cylinder and, in turn, by a three-phase medium-pressure 110-kVA electrode boiler which was supplied by Messrs. Bastian & Allen, Ltd. The two distinct flow temperatures, 160 deg. F. (radiators) and 120 deg. F. (panels), are constantly maintained by mixing valves in the flow mains, the storage temperature being from 160 deg. F. to 240 deg. F. The installation operates automatically and is off-peak time-switch controlled.

The new showrooms of the Bournemouth and Poole Co., showing (left) the lower ground sales floor, (centre) exterior, and the lounge and cashier's counter

The Australian Domestic Appliance Market

MR. M. T. STEWART, Assistant Canadian Trade Commissioner in Melbourne, has been investigating the prospects for imported household electrical equipment in the Australian market. These, he finds, vary considerably in the light of competition from either local tariff-protected factories or imported lines which have been able to obtain a fairly firm footing in the market on account of their superiority in quality to the Australian-made article.

On the whole it is thought that present conditions favour further efforts in the Commonwealth. In fact, Mr. Stewart says, under the present moderate tariff policy the opportunities for overseas manufacturers may be considered better than they have been at any time during the past four years. The popularity of electric washing machines and refrigerators is gradually increasing and they offer scope for a great deal of business.

But Mr. Stewart utters a warning that the Australian market is extremely competitive and in no instance can a comfortable margin of profit be obtained. The overseas shipper must compete on a quality as well as a price basis, as on a price basis only the business would usually go to the local manufacturer.

In electric refrigerators the greatest volume of sales is reported to be in the small 4.2, 4.5 and 5 cu. ft. capacity models, and it is agreed among the trade that it is very difficult to sell a 4.5 cu. ft. machine for much more than £65. The leading refrigerator (imported) with a capacity of 4.2 cu. ft. is retailed at £59 10s., and a popular 4 cu. ft. model is offered at £49 10s.

In emphasising the necessity for keeping the f.o.b. price on the lowest possible basis, Mr. Stewart points out that in the case of refrigerators a difference of £2 between the f.o.b. price of two machines becomes so increased by the addition of duty, exchange, landing charges and sales tax that when the refrigerator is finally offered to the public in Australia the one with the f.o.b. price only £2 higher would probably have to be sold for £8 or £9 in advance of the other.

With regard to electric stoves (cookers) the Canadian Trade Commissioner makes the interesting statement that the local manufacturer has not taken the fullest advantage of his protected position in the Australian market, and consequently that section of the buying public in a position to afford good quality equipment in the home is inclined to favour imported cookers because of their modern design and superior workmanship. The local manufacturer has, however, the complete command of the low-priced section of the market, and it is useless to endeavour to compete. The most popular models are stated to be the table type, with three hot plates and two elements in the oven. The leading local make of this type is retailed at £27 15s. and the similar imported stove at £32. A new imported model in standard black and white enamel costs £36 and a similar stove in coloured enamel £39. An electric "rangette" for use in flats and apartment houses is being successfully marketed at £17 10s.

Mr. Stewart recalls the rather chequered career of the electric washing machine in the Australian market, and says that although the development of sales may still prove rather slow, there are interesting possibilities as the field has not been even partially exploited. It is the opinion of the trade that the retail price of a washer of the ordinary type should not exceed £35. The market for vacuum cleaners is judged by the Canadian Trade Commissioner as not now attractive, on account of intense and well-established competition, unless a manufacturer has something very unusual to offer in the way of quality or price. The attention of importers appears to be directed to securing a cheap cleaner that will retail in Australia at about £10.

The supply systems and wiring regulations vary through the different States of the Commonwealth; even in the same city there may be two voltages. The following particulars of the systems of the leading cities may serve as a general guide:—Brisbane, Queensland: 415-240 V, 50 cycles, 3-phase a.c.; Sydney, N.S.W.: 415-240 V, 50 cycles, 3-phase a.c., and in city area d.c. 3-wire 240 V; Melbourne, Victoria: 400-230 V, 50 cycles, 3-phase a.c., and in city area 460-230 V, 3-wire d.c.; Hobart and Launceston, Tasmania: 415-240 V, 50 cycles, 3-phase a.c.; Adelaide, South Australia: 400-220 V, 50 cycles, 3-phase and single phase a.c., and in city area 400-220 V, 3-wire d.c.; Perth, Western Australia: 460-230 V, 50 cycles, single-phase a.c.

German Radio Exports

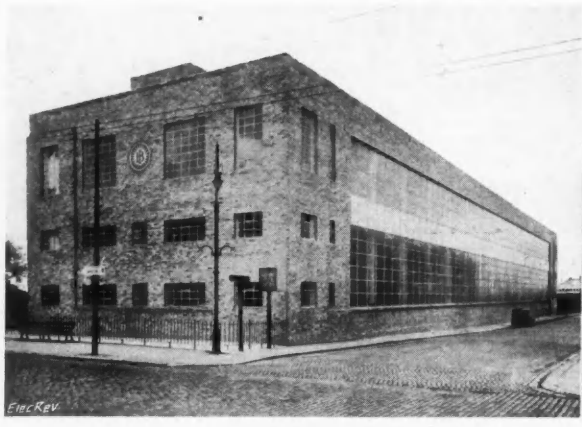
The exports of apparatus for wireless telegraphy and telephony in the first quarter this year are returned at 7,213 cwt. (value, 5.27 million Reichsmarks) as compared with 7,760 cwt. (value, 6.42 million Reichsmarks) in the corresponding period in 1934, and 8,872 cwt. (value, 8.2 million Reichsmarks) in the first three months of 1933, these figures comparing with 21,093 cwt. (value, 21.62 million Reichsmarks) in the first quarter in 1931, which was a record amount. The diminution in the exports this year is partly explained by the reunion of the Saar with Germany so that the deliveries to this region are no longer included in the export figures.

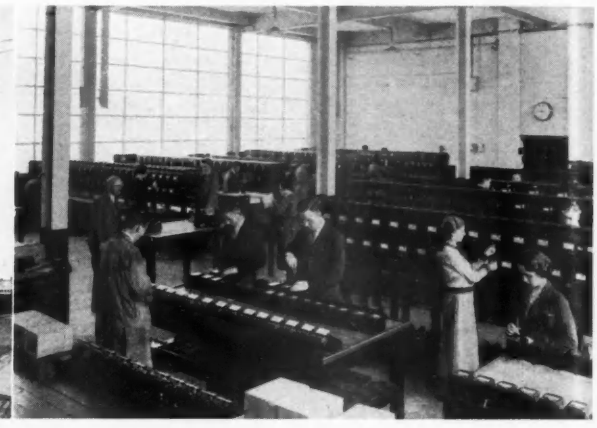
Business and Industrial Notes

The Week's Electrical Trade News from all Sources. Commercial and Industrial Developments. Business Changes, Market Prices for Materials, Trade Openings, New Publicity Literature, Liquidations, and Failures

Extensions at Prescot

Exactly twelve months ago, when describing the Prescot works of British Insulated Cables, Ltd., we referred to the projected enlargement of the electrical fittings department. The growth in output of a.c. meters has called for a separate building for their manufacture, which has now been erected on part of the former site of the dressing shop, adjoining the iron foundry. The new meter shop is a two-storied building 272 ft. long by 50 ft. wide, with a basement for two-thirds of the length. The machine shop contains automatic machines, mostly with integral motors, for turning out small brass parts, multiple-spindle high-speed drills, presses, gear cutters, hobbing machines, &c. Among other alterations nearing completion is the transfer of welder manufacture to a large shop previously used for the assembly of general accessories which is now carried out in larger premises. A power plant with a capacity of 750 kW has been installed for testing welders under working conditions. Other recent additions include a new dressing shop for iron castings with a floor area of 10,000 sq. ft. and a platform connecting three cupolas in the iron foundry that has a storage capacity for 100 tons of pig iron.





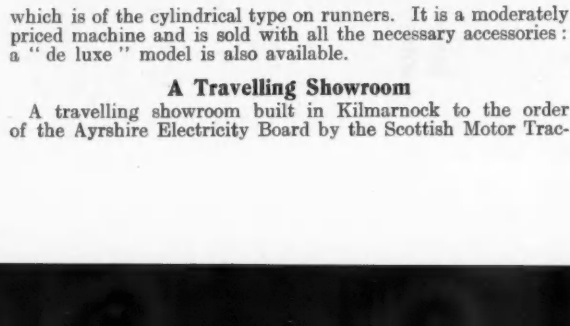
The new meter shop and test room of British Insulated Cables, Ltd., Prescot

Amalgamation of Belgian Companies

Two of the holding companies in Brussels are shortly to be amalgamated. The Electro-Trust is to take over the Union Financière d'Electricité et de Transports and its share capital is to be increased to 360,000,000 fr.

A New Vacuum Cleaner

In introducing the new "Electrix Dustflow" vacuum cleaner Messrs. John Ismay & Sons, Ltd., have prepared showcards and a window display (illustrated below) for the cleaner, which is of the cylindrical type on runners. It is a moderately priced machine and is sold with all the necessary accessories: a "de luxe" model is also available.



The "Electrix Dustflow" vacuum cleaner window display

A Travelling Showroom

A travelling showroom built in Kilmarnock to the order of the Ayrshire Electricity Board by the Scottish Motor Traction Co., Ltd., was inspected on May 24th by the members of the Board. The van is to tour Ayrshire and stops will be made at various towns and villages, where a lady attendant will give demonstrations in cookery and exhibit various types of electrical equipment for the home. The van is electric blue in colour and has a large loudspeaker installed on the roof. A forward compartment houses the petrol engine and generator for supplying electricity to the appliances. Another compartment is arranged as a model kitchen, being fitted with the cooker, water heater, radiators, tubular heaters, ventilating fans, &c. The back of the van opens full out, so that the public can see all the operations of the demonstrator at the electric cooker. Among those present at the inspection were Mr. W. Bexon, engineer and manager of the Board, Mr. R. Russell Brown, secretary, and Mr. W. S. Curry, chief draughtsman.

40-kVA Alternator Urgently Wanted

The Manager of Coney Beach, Porthcawl, is urgently requiring an alternator of approximately 40 kVA. By a printer's error in our last issue it was stated that the machine required was about 400 kVA or larger. The advertisement which appears correctly in our middle supplement this week reads:—"Urgently wanted 400-3-50 alternator 300 r.p.m., for direct coupling, about 40 kVA or larger. Full particulars immediately."

Scottish Contractors' Conference

The Electrical Contractors' Association of Scotland held its annual conference at Taymouth Castle, Perthshire, on May 25th. Coun. R. E. Douglas, Edinburgh, the retiring president, presided at the annual general meeting. Reports were submitted showing the continued progress of the Association.

Works Visit

On May 21st a party of eighteen officers from the Home Fleet anchored in the Thames off Gravesend, visited the Gravesend works of W. T. Henley's Telegraph Works Co., Ltd., and displayed keen interest in the various processes of cable manufacture and in the company's research laboratories and the Henley Tyre and Rubber Co.'s factory. The party was entertained to lunch at which Mr. W. F. Bishop, director and general manager, and Mr. W. McClelland, director, were present.

An Electric Cookery Book

The Hotpoint Electric Appliance Co., Ltd., has prepared an attractive cookery book with the appropriate title of "Carefree Cooking," which it is presenting to every purchaser of a Hotpoint cooker. This contains nearly 100 recipes and in most cases the oven temperature required. A description and instructions in the use of "Hotpoint" cookers are also given and some useful "Do's and Don'ts" for electric cooking. The cleaning of cookers is explained, while the booklet also contains illustrated particulars of the company's other domestic appliances. An index facilitates reference to the various dishes.

French Import Restrictions

According to the *Board of Trade Journal*, the French *Journal Officiel* of May 17th contains two Decrees and two orders, dated May 15th, which extend the system of restricting imports into France to specified quotas to apply to the following apparatus:—Cream separators and similar centrifugal apparatus; electrical and electro-technical apparatus for domestic use and small electro-mechanical appliances; domestic refrigerators, cleaning machines, kneading machines (kneading troughs for

paste, &c.); and refrigerating apparatus. Application for licences to import the foregoing apparatus should be made by importers to the Confédération Générale de la Production Française, 6, rue de Messine, Paris. The quantities allowed to be imported will be limited to the quantities imported during the corresponding month of 1934. Goods proved to have been sent direct to France before May 17th will be admitted without licence.

Indian Import Trade

The imports of electrical goods and instruments into India in 1934-35 amounted to Rs.281 lakhs, as against Rs.230 lakhs in the previous year. The share of the United Kingdom rose from Rs.130 lakhs to Rs.162 lakhs, the share of Germany from Rs.25 lakhs to Rs.31 lakhs, of the United States from Rs.24 lakhs to Rs.30 lakhs, and of the Netherlands from Rs. 11 lakhs to Rs.13 lakhs. The imports of wireless apparatus rose from Rs.11 lakhs to Rs.16 lakhs, those from the United Kingdom declining by about Rs.100,000 to Rs.466,000 in value, while those from the United States rose substantially from Rs.2 lakhs to Rs.8 lakhs, and those from Germany from Rs.1 lakh to Rs.177,000. The imports of electrical machinery rose from Rs.127 lakhs to Rs.169 lakhs. The share of the United Kingdom rose from Rs.86 lakhs to Rs.121 lakhs, and of Germany from Rs.10 to Rs.21 lakhs, but the share of the United States fell from Rs.16 lakhs to Rs.12 lakhs. There was substantial increase in the imports of control and switchgear.

" Emcol " Motors

Messrs. Laurence, Scott & Electromotors, Ltd., draw our attention to the fact that an illustration on page 742 of our last issue may not have made it clear to readers that the " Emcol " motor is one of their products. A feature of the " Emcol " is that it has a straight-through duct and does not clog.

Arc Welding Filmed

On Thursday, May 23rd, at the Gaumont-British Theatre, Wardour Street, three sound films were exhibited to a large audience by Murex Welding Processes, Ltd. The first film showed welding in railways, shipyards, and on storage tanks, &c., together with a demonstration of high-amperage welding in which exceptionally large electrodes were used. This film was followed by one showing the welding of submarine Diesel engine frames, excavators, and a series of " shots " taken at the Bank of England where, on large sections of the new steel-work, welding was used because the elimination of noise was essential; another section dealt mainly with the use of welding on plant for the electrical industry. The third film was taken at the Murex works and showed the manufacture of electrodes and electrical welding machines.

Social Events

The annual sports of Messrs. A. Reyrolle & Co., Ltd., are being held on June 15th at the recreation ground adjoining the company's New Town Works, Hebburn. The prizes and challenge cups are to be presented by Sir Arthur N. L. Wood, chairman of the company.

The Salford and Trafford Park Works of Messrs. Frederick Smith and Co. have recently organised a Social and Athletic Club. Among the activities of the organisation are physical training classes and a Dramatic Society. On May 21st, the ladies' physical training class gave a demonstration of their exercises, and on May 24th and 25th the Dramatic Society presented " For the Love of Mike," a three-act farce, by H. F. Maltby. The Salford canteen was filled to capacity on both evenings, and the performances were of high merit. It was the first production of a new society, only one member of the cast having had previous stage experience. The scenery and lighting had been carried out by members of the society on a specially built stage, and the whole effect was remarkably good.

In the annual golfing competition of the Mersey and North Wales (Liverpool) Centre of the I.E.E., in aid of the I.E.E. benevolent fund, Mr. A. B. Wishart, assistant manager for lamp sales, B.T.H., London, took the thirteenth hole in one stroke. The G. P. Dennis trophy and replica for the best net score against bogey was won by Mr. G. G. L. Preece, a past chairman. In the medal play event the first prize was won by Mr. R. L. Scott, while the four-ball competition was won by C. M. Robson and T. E. Seymour. The Class B winner was Mr. J. E. Allan.

Floodlighting Trinity Church, Folkestone

Situated in a prominent position, Trinity Church, Folkestone, is a particularly suitable subject for floodlighting, and the equipment which has recently been installed has proved highly successful. The main building is floodlighted by three Ediswan " Saturn " lanterns with " Escura " electric discharge lamps, with colour introduced locally in certain architectural features. For the spire four " Mars " projectors were used, each fitted with one 1,000-W projector lamp. The installation was carried out by the Folkestone Electric Supply Co., Ltd., in collaboration with the Edison Swan Electric Co., Ltd.

Trinity Church, Folkestone, floodlighted by means of Ediswan apparatus

Trade Announcements

Messrs. L. Benn & Co., Ltd., and the Direct Electric Lamp Co., Ltd., have centralised their purchasing and on and after June 1st the newly formed L. B. & D. Electrical Co., Ltd., will be responsible for the payment of accounts. This company, whose registered office is at 80, City Road, E.C.1, has been registered with a capital of £2,000, with no mortgages or debentures outstanding; the directors are Messrs. H. & S. Davis.

Rotapex, Ltd., has removed to more commodious premises with showrooms at 65, Mortimer Street, W.1.

Hanovia, Ltd., is removing its main offices and works on June 1st to Bath Road, Cippenham, Slough (telephone: Burnham 500).

The Brush Electrical Engineering Co., Ltd., is opening a branch office at Haworth's Buildings, Cross Street, Manchester. The new branch will be under the supervision of Mr. A. W. Berry, the company's technical engineer representative.

From to-morrow (Saturday) the telephone number of Switchgear & Cowan, Ltd., Manchester, will be " Trafford Park 1077."

Prices of Materials

Messrs. Frederick Smith & Co. report, May 29th :—Electrolytic copper bars, £38 10s., 10s. increase. Ditto, ditto, wire rods, £42 10s., 10s. increase. Ditto, ditto, h.c. wire, 6⅞d., ⅛d. increase. Silicium bronze wire, 7½d., ⅛d. increase.

Messrs. Henry Gardner & Co., Ltd., report, May 29th :—English pig lead, £16 10s., 5s. decrease. No change in the price of copper bars, best selected, sheet and rod.

Messrs. Edward Till & Co. report, May 29th :—No change in the price of India rubber, Para fine.

A recent shipment of " Hotpoint " cookers and washing machines despatched from the Rugby works of the British Thomson-Houston Co., Ltd.

The Exide Convention

The Exide Service Convention which has been held this week at Eastbourne was attended by 800 delegates and guests from the United Kingdom and overseas. One of the special guests was Mr. F. Crawter, who recently retired from the company after thirty-eight years' service.

New Municipal Showrooms

The Finance Committee has recommended the Bexhill-on-Sea Town Council to approve in principle the establishment of a showroom for the demonstration, hire and sale of electric cookers, water heaters and washers, and proposes that the Council should consult local contractors as to the future development of the showroom. This is in place of a recommendation by the Electricity Committee that the Council should approve of a showroom for demonstration, hire and sale of electric cookers, water heaters, washers and refrigerators.

A group at the opening of the new Tipton premises of the Midland Electric Corporation for Power Distribution, Ltd.

The E.A.W. (Yorkshire) Conference

The Yorkshire County Organisation of the Electrical Association for Women held a conference at Ilkley on May 25th, on "Electricity in Working-class Homes." Mrs. Woodhouse, the president, in her opening remarks explained the factors which had led to the conference and said the Yorkshire County Organisation had taken a practical step in helping the working woman to use electricity in her home by equipping a working-class house at Burley-in-Wharfedale with apparatus suitable to her means. The house, one of a small colony erected by the Henston Building Co. and lent to the Association for this purpose, had been equipped with an electric cooker, wash-boiler, kettle, fire and iron. Costs were based on actual use and it was shown that apparatus could be used for from 1s. per week up to 2s. 10d. per week, including hire charges for the larger apparatus. Miss C. Haslett, the director of the Association, addressed the Conference and said that the Association in London last November equipped model kitchens which were exact copies of kitchens in Bermondsey, West Ham, Cumberland Market and other places where electricity had been used with success in working-class houses, but it had been left to Yorkshire to go one better and show electricity in the actual home. Mr. W. B. Woodhouse, in discussing the amount which can be spent on electricity, gave figures of total fuel costs in small houses where between 2s. and 5s. per week was spent on lighting and heating. The delegates inspected a large range of electrical appliances in the Conference Hall at Ilkley, and afterwards visited the model working-class home at Burley-in-Wharfedale. After the private view the house was opened for inspection by the public and will remain open for the next week or two.

The electric kitchen of the Burley-in-Wharfedale model working-class home

The Midland Electric Corporation's New Premises

A large block of new buildings erected for the Midland Electric Corporation for Power Distribution, Ltd., at Tipton, were recently opened by Mr. G. H. Nisbett, chairman of the company. The new buildings have been erected in order to centralise the work of the chief engineer and mains superintendent, and comprise the headquarters of these two officials and their staffs, together with shops for fitters, plumbers, carpenters, and departments for central stores, transport and meters. Advantage has been taken of the opportunity to provide better facilities for the staff and workmen. New messrooms have been erected and the kitchens equipped with electric water heaters and cookers. The buildings include a conference room for meetings between the electrical contractors, manufacturers of electrical apparatus, and the company's officials, who jointly cater for the electrical needs of the company's area of supply. This room will also serve for demonstrations of domestic electrical apparatus. Part of the site of nineteen acres has already been developed as a sports centre, and it is intended in the near future to add to the facilities now provided in the way of recreation. In opening the buildings Mr. Nisbett referred to the great progress made by the company during the twenty-eight years he had been a director, and said he believed they were the first company in the country to join with local authorities in co-operative efforts to produce cheaper electricity through the formation of a Joint Electricity Authority. Their consumers were now getting the benefit of this, and also of the profit-sharing scheme recently negotiated in the 1933 Special Order in the form of a 20 per cent. rebate. The tendency was for prices to decline even further in the future.

Key Industry Duty

A representation has been made to the Board of Trade under Section 10 (5) of the Finance Act, 1926, for the exemption from duty of thermocouple alloy wire composed of nickel and chromium, or nickel, manganese and aluminium with or without other substances in either case. Any communication should be addressed to the principal assistant secretary, Industries and Manufactures Department, Board of Trade, Great George Street, S.W.1, within one month from May 27th.

A Porcelain Connector Showcard

We have received from the V.G. Manufacturing Co., Ltd., Gorst Road, Park Royal, N.W., a display card which the company is circulating to the electrical trade. This is printed in yellow, blue, green and black. It has attached to it three of the company's "Scruit" porcelain connectors and shows the method of applying these.

The Highland Show

At the forthcoming Highland Show, which will be held in Aberdeen, Aveling-Barford, Ltd., will have a comprehensive display of their products, including an electrically operated sterilising chest and electrically driven bottle-washing machines.

Electricians' Wages

At a conference of representatives of the Electrical Trades Union and the National Federated Electrical Association on May 27th the employers withdrew their refusal to concede any advance in wages, and it was decided to set up a joint committee of the two sides. This committee will investigate the position with a view to formulating machinery for the future regulation of wages, on the understanding that it will embody an advance on the present rates.

Scientific Management

On July 15th the sixth International Congress for Scientific Management is to be opened by its patron, the Prince of Wales, in the Central Hall, Westminster. For four days a series of conferences will provide a channel for expert discussion on the problems of practical management in relation to industrial, commercial, agricultural and domestic matters. Parallel with these technical conferences a comprehensive hospitality programme has been arranged. To conclude the congress visits of factory inspection covering representative types will be available to members. Special tours have been planned for the particular benefit of foreign members so that they may be able to see examples of British industrial and commercial organisation.

New Catalogues and Lists

British Insulated Cables, Ltd., Prescot.—New booklets on copper and aluminium sheets, condensers, "Rockbestos" switchboard cables and wires, and a leaflet on multiple telephone cables for indoor use.

Cooper & Smith, 14, Chicheley Street, York Road, S.E.1.—A price list of flush ceiling or wall fittings.

Brown Brothers, Ltd., Great Eastern Street, E.C.2.—An interesting booklet has been produced on radio service. It is in three sections—battery charging, testing equipment, and interference suppression.

Renold & Coventry Chain Co., Ltd., Didsbury, Manchester.—A leaflet dealing with chains for conveyors and elevators.

Halcyon Radio, Ltd., Sterling Works, Dagenham.—A pamphlet relating to a.c. radio receivers.

General Electric Co., Ltd., Magnet House, Kingsway, W.C.2.—A complete catalogue of industrial electric cooking equipment.

Westinghouse Brake & Signal Co., Ltd., 82, York Road, N.1.—A booklet on metal rectifiers for electro-plating.

Switchgear & Cowans, Ltd., Elsinore Road, Manchester, 16.—A booklet dealing with service tested switchgear.

Ioco Rubber & Waterproofing Co., Ltd., Netherton Works, Anniesland, Glasgow, W.3.—Synthetic resin products and rubber flooring are described in two new booklets.

Sun Electrical Co., Ltd., 118, Charing Cross Road, W.C.2.—A new fan catalogue.

General Radiological & Surgical Apparatus Co., Ltd., 204, Great Portland Street, W.1.—An article by Dipl. Ing. F. Claassen on "Half-wave X-ray Apparatus."

Johnson & Phillips, Ltd., Charlton, S.E.7.—A complete 94-page illustrated catalogue of overhead line materials.

International Combustion, Ltd., Aldwych House, W.C.2.—"Combustion and Steam Raising" is the title of a new booklet.

F. Thomas & Co., Ltd., 189, Drummond Street, Hampstead Road, N.W.1.—A list showing a new range of lighting fittings.

Ferguson, Pailin, Ltd., Higher Openshaw, Manchester.—New catalogue sections on current limiters and oil circuit-breakers.

Enfield Cable Works, Ltd., 296, High Holborn, W.C.1.—A general catalogue of "Enfield" wiring systems.

Berkeley & Young, Ltd., Tyseley, Birmingham, 11.—A leaflet on a new "Jubilee" cooker and a booklet called "A Week in the Life of a Nippy Cooker."

E. K. Cole, Ltd., Ekco Works, Southend-on-Sea.—An abridged list of new developments by the communication engineering department has been received.

Britannia Batteries, Ltd., Redditch.—A catalogue describing "Tubular" lead acid batteries for electric vehicles, trucks, &c.

L. G. Hawkins & Co., Ltd., 30/35, Drury Lane, Kingsway, W.C.2.—Particulars of a showroom offer of the "Teesmade," together with leaflets on the "Culinaire," kettles, washboilers, fans, and other small domestic appliances.

A. Reyrolle & Co., Ltd., Hebburn-on-Tyne.—Particulars of a portable earth tester.

Bankruptcy Proceedings

W. H. Tordoff, 10, Burnett Avenue, Manchester Road, Bradford, electrical engineer.—The public examination of this debtor was held at the County Court, Manor Row, Bradford, on May 24th. The statement of affairs returned disclosed liabilities of £1,968, with a deficiency of £1,859. Debtor attributed his failure to shortage of capital, taking contracts too big for his resources and submitting tenders too low to show a working profit. The examination was concluded.

A. E. Poole and **H. Marsters** (Poole's), 33, Union Street, Wednesbury.—Public examination June 6th at the Court House, Lichfield Street, Walsall.

F. M. Crane (C. S. Mayfield & Co. and the Sutton Electrical Installation Co.), electrician, 67, Carshalton Road, Carshalton, and 38, Brighton Road, Sutton.—Discharge suspended for nine months until January 17th, 1936.

R. J. Eggleston, electrical merchant, Huddersfield Buildings, Talbot Road, Port Talbot.—Trustee, Mr. L. S. Findlay, 35, Windsor Place, Cardiff, appointed May 16th.

F. E. Lansdown, radio and electrical engineer, 68a, High Street, Winsford.—Receiving order made May 21st on debtor's own petition.

T. O. Lake, electrical factor, "Wayside," Whatton-in-the-Vale, Notts.—Receiving order made May 20th on debtor's own petition.

F. Adams and **R. Barlow,** electricians, 11, Station Parade, Wanstead.—Last day for receiving proofs for dividend June 8th. Trustee, Mr. E. Parke, Bankruptcy Buildings, Carey Street, W.C., Senior Official Receiver.

T. McKnight, electrical contractor and wireless dealer, 9, Tootal Road, Weaste.—Last day or receiving proofs for dividend June 8th. Trustee, Mr. L. A. West, Byrom Street, Manchester, Senior Official Receiver.

Company Liquidations

Radio Centre, Ltd., 25, Haymarket, S.W.—The statutory meeting of creditors of the above was held on May 24th at the Institute of Chartered Accountants, Moorgate Place, London, E.C. Mr. G. D. Morton, one of the directors, occupied the chair. A statement of affairs was submitted which showed liabilities of £5,435. The assets comprised book debts £344, amount due under an agreement £5,000, and unpaid calls £1,050. The issued capital was £8,014. The chairman said that the company was started in 1933 to provide a place where members of the public could hear the different sets which were on the market, and at the same time receive advice. Manufacturers were approached to supply sets on loan. All sales were passed through dealer members who joined the Radio Centre, paying an annual subscription. Some time ago a contract was entered into with another company, but it had not been carried through. Finally the bailiff was put in for rent, and the furniture and sets were seized. It was further stated that a scheme was being prepared which provided for a new company to be formed to acquire the goodwill and certain of the assets of the present concern. With regard to the creditors it was proposed that those interested to an extent of less than £10 each should be paid in cash, while the remainder should be allotted redeemable preference shares carrying interest at the rate of 5 per cent. per annum. Those shares would be redeemed out of future profits, while any cash received from the liquidator of the old company would be used for the same purpose. The creditors passed a resolution unanimously confirming the voluntary liquidation of the company with Mr. Leyton Bennett as liquidator. A committee of four of the principal creditors was also nominated.

A section of the display of the Irish Free State Electricity Supply Board at the Dublin Spring Show

Sykes & Dyson, Ltd., manufacturing electrical engineers, Queen's Mill Road, Huddersfield.—The statutory meeting of creditors was held on May 22nd at 16, John William Street, Huddersfield. The statement of affairs showed ranking liabilities of £4,700, of which £4,547 was due to the trade, and the balance of £154 to cash creditors. In addition the bank were fully secured creditors for £1,938, and they held a mortgage on leasehold premises, plant, machinery, &c. The net assets were £3,583, leaving a deficiency, so far as the creditors were concerned, of £1,118. The issued capital of the company was £5,000, there having been allotted 5,000 ordinary shares of the face value of £1 each, all fully paid. As regarded the shareholders there was a deficiency of £6,118. It was stated that the company had been trading since 1924, and during the last two years had carried on at a loss. Recently conferences of the principal creditors were held with a view to considering the question of financing the business. It was, however, found that no further finance would be available and the shareholders consequently passed the necessary resolutions for voluntary liquidation, and appointed Mr. H. V. Wood and Mr. J. E. Sykes, both of Huddersfield, as joint liquidators, with a committee consisting of the representatives of Messrs. Haye & Co., Ltd.; Hanson Dale & Co., Ltd.; Yorkshire Precision Castings Co., Ltd.; and the Electrical Accessories Co., Ltd. It was stated that in addition to the liabilities shown on the statement there were contingent liabilities in respect of contractual obligations entered into by the company, the amount of which could not be estimated. Resolutions were passed confirming the appointment of the liquidators already nominated, together with the committee.

Battery Components, Ltd.—Meeting June 21st at Balfour House, Finsbury Pavement, E.C., to receive an account of the winding up by the liquidator, Mr. W. A. J. Osborne.

Leatherhead & District Electricity Co., Ltd.—Winding up voluntarily. Liquidator, Mr. D. Robertson, 46-47, New Broad Street, E.C.

Spanish Telephone Co., Ltd.—Winding up voluntarily. Liquidator, Mr. H. E. Monson, 64, Coleman Street, E.C.

Underground Electric Railways Co. of London, Ltd.—Meeting June 27th at 55, Broadway, S.W., to receive an account of the winding up by the liquidator.

Private Arrangement

D. W. Thompson, Ltd., 6, Regent Parade, Sycamore Corner, Amersham, Bucks, wireless and electrical factors.—At the meeting of the creditors of the above, the statement of affairs showed ranking liabilities of £745. After allowing £46 for preferential claims the net assets were £397, leaving a deficiency, so far as the creditors were concerned, of £348. It was reported that the company was registered in February, 1934, with a nominal capital of £500, of which £450 was issued and subscribed for in cash. During the first six months the business was that of repairers and dealers in batteries, but subsequently a radio business was developed. Recently there had been a loss on the trading, which was attributed to the adoption by the company of a hire rental service and a drop in the turnover. A debenture had been issued, but it was stated that it would not constitute a first charge on the assets. The opinion was expressed that the company should not at this stage go into liquidation, and it was decided to adjourn the meeting.

Electricity Supply

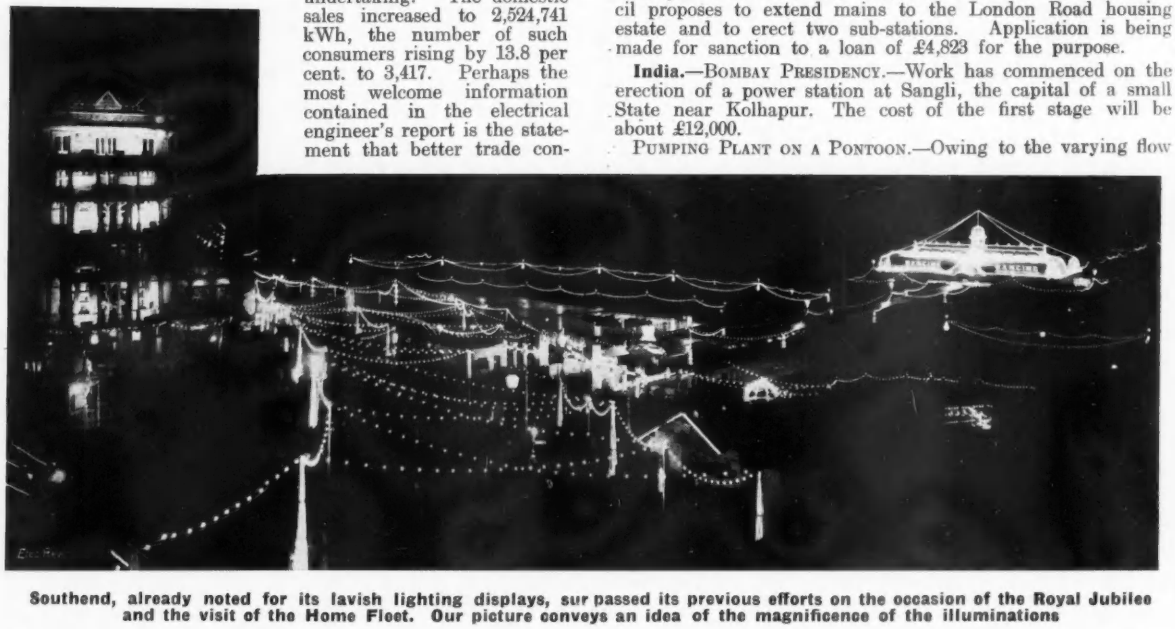
Lighting, Domestic, Power

Aberayron.—PUBLIC-LIGHTING CONTRACT.—The Urban District Council has accepted the tender of the Aberayron & District Electricity Supply & Power Co., Ltd., for public lighting with sixty lamps for a period of seven years.

Bedford.—ILLUMINATIONS.—The Town Council has decided that the floodlighting of the River Ouse and of St. Paul's Church spire, carried out on the occasion of the Royal Jubilee, shall be continued on four nights a week throughout the summer.

Cardiff.—FLOODLIGHTING.—The city electrical engineer recently reported to the Electricity Committee that the total consumption of energy for the Jubilee illuminations was 5,346 kWh, of which 4,112 kWh was used for the illuminations in Cathays Park and for floodlighting the various buildings, including the city hall. He was instructed to prepare a report stating how much permanent floodlighting would cost.

Chesterfield.—A YEAR OF RECORD PROGRESS.—The annual report for the year ended March 31st last of the electricity undertaking, sent to us by Mr. D. H. Davies, the borough electrical engineer, shows that there was an increase of 13.7 per cent. in output as compared with the previous year, the total being 17,600,000 kWh, which constitutes a record for the undertaking. The domestic sales increased to 2,524,741 kWh, the number of such consumers rising by 13.8 per cent. to 3,417. Perhaps the most welcome information contained in the electrical engineer's report is the statement that better trade conditions and the connection of some new factories brought the demand for power purposes, which forms the bulk of the output, up by 16.6 per cent. to 10,400,000 kWh. During the year 21.62 miles of new mains were laid, 890 new installations connected and 659 applications for additional supplies dealt with. There was an increase of 2,837 kW in the connected load, and the number of consumers rose to 15,129. A table of the number of domestic appliances in use shows the chief items to be: irons, 4,318; fires, 3,132; cookers, 916; and vacuum-cleaners, 678. The net profit decreased from £9,022 to £4,417, due almost entirely to reductions in charges which came into operation last July.



Southend, already noted for its lavish lighting displays, surpassed its previous efforts on the occasion of the Royal Jubilee and the visit of the Home Fleet. Our picture conveys an idea of the magnificence of the illuminations

China.—HYDRO-ELECTRIC POWER.—The Kiangsi Provincial Government is commencing the construction of a hydro-electric installation at Nanchung, £85,000 having been allocated for the first stage of the project, which will afterwards be duplicated. The tail water will augment the existing supply to the city.

Cleethorpes.—ANNUAL REPORT.—The report on the working of the undertaking for the year ended March 31st last has now been issued by Mr. B. S. Lord, the electrical engineer and manager. A gratifying increase in the sales of electricity is recorded, namely, from 1,625,642 kWh in 1933-34 to 2,224,423 kWh, representing an advance of 36.8 per cent. There were 795 new consumers connected during the year, and about one-third of these utilised the assisted-wiring scheme. The maximum demand rose from 973 to 1,143 kW. The cooking demonstrations proved a successful innovation, and they are to be continued. Since February wash-boilers and breakfast cookers have been available on the hire-purchase system, while the hiring out of cookers, inaugurated in February, 1934, has resulted in seventy-seven being installed.

Deer (Aberdeenshire).—REQUESTS FOR A SUPPLY.—The Council has appointed a committee to make a survey of the district following requests for electrical facilities.

Docking.—SUPPLY EXTENSIONS.—The East Anglian Electricity Supply Co. has informed the Rural District Council that a supply of electricity for Houghton and West Rudham will be available in the early autumn. The Council has asked the company to hasten the work of providing a supply to Syderstone and the Birchams.

Dufftown.—CANVASS.—The Grampian Electric Supply Co., Ltd., has authorised a canvass of the burgh with a view to ascertaining the number of prospective consumers.

East Harlsey.—ELECTRICITY SUPPLY AGREEMENT.—The Parish Council has agreed to accept an offer of the North-Eastern Electric Supply Co., Ltd., to provide the village with electricity for domestic purposes subject to the parish having street lighting.

Elstree.—BETTER STREET LIGHTING.—The Parish Council proposes to make arrangements for improving the street lighting in the Aldenham area.

Germany.—A LONG TRANSMISSION LINE.—Work is in hand on the erection of a 100-kV transmission line between Neiderhausen and Rheinau (Mannheim), a distance of about 50 miles, in connection with the distribution system of the Rhenish-Westphalian Electric Power Co.

Grantham.—CIVIC CENTENARY.—Arrangements for celebrating the centenary of municipal government in Grantham shortly include the floodlighting of the parish church, market cross, Newton monument, and King's School.

Grays.—ELECTRICITY FOR ESTATE.—The Urban District Council proposes to extend mains to the London Road housing estate and to erect two sub-stations. Application is being made for sanction to a loan of £4,823 for the purpose.

India.—BOMBAY PRESIDENCY.—Work has commenced on the erection of a power station at Sangli, the capital of a small State near Kolhapur. The cost of the first stage will be about £12,000.

PUMPING PLANT ON A PONTOON.—Owing to the varying flow of the River Indus at different seasons of the year the Hyderabad (Sind) Municipality is abandoning its pumping station on the banks in favour of an electrically driven pumping set installed on a floating pontoon moored 600 ft. from the shore. The delivery side of the pump will be connected to the shore by floating pipes, made flexible by ball-and-socket joints, and the output is estimated at 275,000 gallons per hour.

HYDRO-ELECTRIC POWER.—The Government of the Central Provinces is considering a proposal to harness the River Pench to provide power for industries, agriculture and railway electrification. Nagpur, the capital town, is the joint terminus of the G.I.P. and Bengal-Nagpur Railways on the Bombay-Calcutta trans-continental route.

Kirkcudbrightshire.—NEW CONSUMERS.—The County Council has arranged to give a supply of electricity to the Scottish Milk Powder Co. for their factory at Kirkcudbright. There is to be a guaranteed minimum consumption of 200,000 kWh and a minimum payment of £600 per annum. A supply will also be given to the premises of the Scottish Milk Marketing Board.

London.—CINEMA LIGHTING.—It is reported in *To-day's Cinema* that the provision of adequate floor lighting is to be included in future as a condition of the London County Council's approval of proposals for electrical installations at new or reconstructed cinemas in London.

BATTERSEA.—It has been suggested by the Mayor that the equipment purchased for the Jubilee celebrations should be used to floodlight the town hall whenever there is a meeting of the Council. This, it is thought, would stimulate the interest of the electorate in local government affairs.

HAMMERSMITH.—At a cost of £870 the Electricity Committee is to provide a supply to the West London Hospital, Hammersmith Road; the Committee is also seeking sanction to borrow £4,334 for cable and switchgear in connection with the provision of an additional bulk supply to the Brentford and Chiswick Corporation.

ST. PANCRAS.—Mains extensions costing £1,456 are proposed by the Electricity Committee.

Leicester.—ELECTRIC COOKING POPULAR.—At a recent meeting of the Electricity Committee it was reported that there are now more than 10,700 electric cookers in use in the city. This is equal to one cooker for every twenty-one inhabitants.

Manchukuo.—A MERGER.—The Manchukuo Electric Business Company, virtually a Government concern, has effected a merger with several small-town electrical concerns which will give the company control over 260,000 kW of Manchukuo's total load of 400,000 kW. The only important concern outside the merger is the Penchihu Coal & Iron Company, which has generating plant with a capacity of 130,000 kW. Prospective new works include an increase in capacity from 5,000 kW to 15,000 kW at Hsinking, a new 10,000-kW station at Harbin, a 2-000-kW station at Tsitsihar, and several smaller ones, at an estimated cost of £1,500,000.

Northallerton.—SUPPLY OFFER ACCEPTED.—The North-Eastern Electric Supply Company's offer to provide electricity to the village for domestic and street lighting purposes has been accepted by the Parish Council.

Northern Ireland.—BELFAST.—Owing to housing and other development in the Malone and Shankill areas the Electricity Committee considers it necessary that a new primary transmission scheme should be carried out from the Harbour power station to the Co. Antrim side of the city. It is proposed to lay duplicate 33-kV underground cables from Shore Road direct to the existing Malone and Shankill sub-stations and to make application for sanction to a loan of £54,831 to cover the cost of the work.

Norton (Durham).—RURAL AREAS.—As a result of further representations by the Rural District Council the North-Eastern Electric Supply Co., Ltd., has agreed to proceed as early as possible with supply schemes in the rural areas.

Norwich.—STREET-LIGHTING SCHEME.—The report of the Special Committee appointed to consider the improvement of street lighting has been approved. It is proposed that the standard of lighting throughout the city should be brought into line with the B.S. Specification, entailing an increase in the number of lamps from 3,833 to 4,363 at a cost of £23,521. There are two alternative schemes recommended by the electrical engineer, Mr. V. A. Pask, one utilising tungsten-filament lamps only and the other making use of electric-discharge lamps on Class C roads in the city and on all main roads. The Committee, although agreeing with the second recommendation in the main, considers that further experiments should be carried out regarding lighting in the city.

Orpington (Kent).—ERECTION OF CABLES.—The Urban District Council has given permission for the West Kent Electric Co., Ltd., to erect overhead cables at Pratt's Bottom and Knockholt.

Stretford.—A NEON EXPERIMENT.—One face of the town hall clock has been fitted with a system of neon lighting to illuminate the figures and hands. If the experiment is successful the other three faces may be similarly treated.

Sunderland.—AUTUMN ILLUMINATIONS SCHEME.—As an outcome of the Jubilee celebrations the chairmen and vice-chairmen of several Corporation committees recently met together to consider the practicability of arranging for special autumn illuminations. It was thought that such an innovation would be much appreciated, and instructions were given for schemes to be prepared.

Sutton Valence.—MAINS EXTENSIONS.—The Kent Electric Power Co. has received permission to lay underground cables in the area.

Tynemouth.—PUBLIC LIGHTING PLANS CURTAILED.—At a meeting of the Electricity Committee reference was made to a reduction of £3,500 in the estimates of expenditure in respect of public lighting. It was decided that £2,000 could be saved by abandoning schemes for the erection of additional lighting standards in shopping centres, except in Prudhoe Street. The electrical engineer and borough engineer were instructed to ascertain how the remaining £1,500 could be saved.

Wellingborough.—NO ELECTRICITY FOR COUNCIL HOUSES.—Requests for the installation of electricity by tenants of Council houses in Abbey Road and Ashfield Road, Wellingborough, have been refused by the Urban District Council.

Welwyn.—ELECTRICITY FAVOURED.—In response to a letter sent out by the clerk to the Rural District Council 135 tenants of Council houses expressed their desire to have electrical facilities, thirty-five were not in favour, and forty did not reply. Tenders are to be obtained for the work to be carried out, and the Minister of Health is being asked whether the amount required to be raised by increased rentals may be spread over the whole of the housing estates.

Weymouth.—MAINS EXTENSIONS.—The Electricity Committee is seeking sanction to borrow £25,000 for mains and services and £5,000 for plant.

A STREET-LIGHTING PROBLEM.—In March, 1931, the Upwey Parish Council entered into an agreement with the Weymouth Consumers' Gas Co. providing that the company should install gas street lighting in the parish, the agreement to remain in force for twenty years. Subsequently Weymouth was extended, and the Corporation took over the duties of the Parish Council. When the Corporation installed an electric lamp in Upwey the Gas Company protested. The Corporation was advised that the effect of the agreement was that, while such gas lamps as were already installed could not be changed over to electricity during the period, it could install additional electric lamps. It was agreed by both the Corporation and the Gas Company that a case should be submitted for counsel's opinion. This has now been received and supports the view held by the Corporation.

Ystradgynlais.—ELECTRICITY IN RURAL AREAS.—The draft agreement between the South Wales Power Co. and the Ystradgynlais Council with regard to electricity supply in the rural district has been before the Council. The consulting engineer, Mr. Dan Jenkins, said it was likely that Cobren, now without a system of street lighting, would be the first to secure a supply under the new arrangement. The supply for the rural district would be changed from d.c. to a.c.

Commission's Report on the Johannesburg Undertaking

THE report of the Commission of Inquiry into the Johannesburg municipal electricity undertaking has now been issued. The Commission consisted of Mr. C. J. Spencer, of London (chairman), Mr. J. R. More, former manager of the South African Railways, and Prof. S. H. Frankel, of the Witwatersrand University. Mr. A. L. Barber, commercial manager of the London Passenger Transport Board, was technical consultant.

The report states that the financial position of the Electricity Department is sound, and allows of the development policy suggested in the report. Unless this is done, the Council will not be doing justice to the growing needs of the city. Since its inception to June 30th, 1933, the department has paid to the general funds of the city net profits—after deducting losses totalling £1,807,344 and £480,166 as assessment rates and street charges—amounting to £2,287,510. The allocation of the profits in relief of rates, the Commission considers, unduly favours the ratepayer at the expense of the consumer. The profits should be used in improving the services, in reducing the tariff, and in stimulating the use of electricity for industrial and general purposes.

The Commission states that the delay in enlarging the power station has not only involved a real danger of curtailment of supply, but has also caused the Council considerable financial loss, resulting in the retention of old and inefficient plant and an extremely high cost of generation. Had the important and necessary extensions recommended by the manager been carried out ample plant would have been available for 1932-33, thereby saving a large sum annually on upkeep and standby costs.

In the circumstances, it is fortunate that the connection between the municipal power station and the Victoria Falls and Transvaal Power Co. has been made, otherwise a serious crisis would have arisen this year. Even with this connection the position is far from safe; the breakdown of one of the large municipal turbines would bring about a serious shortage of supply. The position of the power station cannot be considered safe until the total capacity is 33 per cent. in excess of the probable maximum demand. There has been a loss of approximately £14,000 each year since 1932, which will continue until sufficient plant is available at Jeppe Street power station to justify closing down the President Street station. It is suggested that a small committee with adequate powers should control the Electricity Department, and that the Council should have the advice and services of an experienced firm of consulting engineers. An up-to-date sales organisation should be established for the development of the department's business.

Dealing with the workshops, the Commission severely criticises the administration and lack of discipline, and states that the general manager cannot be absolved from responsibility, but it recognises that the running of the power station has for many years presented exceptional difficulties which have been met and overcome with credit by the manager and his staff. In view, however, of the rapid growth of the city and the future needs of the undertaking the Commission feels that the Council should secure the services of a highly qualified administrative and electrical engineer with modern experience, to be in complete charge of the undertaking. It is also stated in the report that the workshops are too small and unsuitable for use as a tramcar repair depôt, and the workshop practice generally is not up-to-date. It considers that the only effective remedy for the existing general inefficiency is to appoint a reliable workshop superintendent. When this has been done the electrical and mechanical workshops should be amalgamated and the position of assistant mechanical engineer abolished. Suggestions are also made for promoting a better psychological atmosphere in the workshops.

The Tramways and Lighting Committee has had the report under consideration, and has decided to ask the manager, Mr. A. T. Rodwell, to report on his staff arrangements and personnel.

Traction

Australia.—ADELAIDE TRAMWAYS.—The report of the Adelaide Tramways Trust for the half-year ended January 31st shows that there was an increase of nearly £10,000 in revenue. The gross surplus of £122,263, however, was more than absorbed by reserves for renewals, interest, sinking fund, &c., which totalled £124,636, leaving a deficit of £2,373.

SYDNEY UNDERGROUND RAILWAY.—The underground railway at Sydney is to be extended northward for a short distance from St. James's station to provide storage accommodation for at least six eight-car electric trains. The estimated cost of the extension is £40,000.

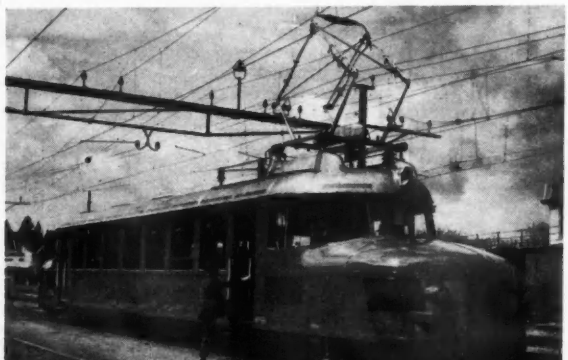
Blackburn.—TRAMS TO BE RETAINED.—Faced with an expenditure of £30,000 during the next four years on tram track renewal, the Town Council instructed the Transport Committee to consider the future policy of the undertaking. The Committee has now decided that trams shall be retained. New electric motors are to be purchased for the trams on the Wilpshire section in order to provide a faster service.

Great Britain.—SOUTHERN RAILWAY.—The official opening of the Southern Railway Company's electrified lines from London to Hastings and Eastbourne has been fixed for July 4th.

LONDON TRANSPORT BILL.—The Select Committee of the House of Commons has decided that the scheme to improve the Metropolitan Railway facilities and to reconstruct Baker Street station is justified. The cost will be £5,925,000.

Newcastle-upon-Tyne.—TROLLEY-BUSES.—It is probable that trolley-buses will be in operation by August, the work of erecting the new overhead equipment having made rapid progress.

Switzerland.—HIGH-SPEED TRAINS.—On May 15th the Swiss Federal Railways put into service between Bienne, Berne, Olten, and Lucerne the first of a number of lightweight coaches with a maximum speed of 82 m.p.h. Each coach weighs 32 tons and seats seventy persons. A pantograph collects the 15-kV single-phase supply, which is passed through a 220-kVA oil-cooled transformer to two 130-kW traction motors. So far the coach has covered 360 miles daily.



One of the new Swiss high-speed electric railway coaches

Communications

Australia.—NEW TELEPHONE CABLE.—Tentative arrangements have been made to open a telephone service between the mainland and Tasmania in April, 1936. The submarine cable to be laid across the Bass Strait is being manufactured in England and will be about 180 miles long, embodying recent improvements.

Canada.—TELEPHONE CONVERSATIONS.—A *Reuter* message from Ottawa states that according to statistics issued there the number of telephone conversations originated in Canada last year was equal to 214 per person. This is stated to be the highest average in the world, the United States being second with 191.4 conversations for each person, Denmark third with 158.7 and Sweden fourth with 137.4.

Ceylon.—TELEPHONY.—The Government of Ceylon has in hand a large scheme of telephone extensions and improvements. The automatic system will be extended from Colombo to the out-stations, commencing with the exchanges at Mount Lavinia and Peradeniya. At least twelve new planting areas in the Central, Sabaragamuwa and Southern Provinces will receive telephone connections for the first time, involving the establishment of several exchanges.

China.—TELEPHONE NETWORK.—A large network of long-distance telephone lines will radiate from Changsha, in Hunnan Province. Connection has just been established with Liuyang and Pingkiang, and work will shortly be commenced on lines to Chinchi and Tsinchih. A long-distance line was completed in Kiangsu Province in the middle of May from Chinkiang to Tsingkiangpu, and work in other districts is being expedited to give a complete long-distance service throughout the Province at an early date.

Great Britain.—TELEVISION.—It is officially announced that a B.B.C. television station is to be built at the Alexandra Palace, in North London, and that the whole of the south wing will be required for the purpose.

NEW B.B.C. PREMISES.—Queen Margaret College, Glasgow, has been purchased by the British Broadcasting Corporation for new studios and offices.

LOWER TELEPHONE CHARGES.—The Postmaster-General (Sir Kingsley Wood) stated last week that the temporary reduction in the telephone rates between this country and the Dominions and India has resulted in an increase in traffic of over 70 per cent. To-morrow a system of reduced night charges in the radio telephone services to the United States and Canada will come into force, the reduction amounting to roughly 30 per cent.

Japan.—RADIO TELEPHONY WITH SIAM.—Direct radio-telephone service will commence operation between Tokyo and Siam early in June, and the service between Tokyo and Shanghai only awaits the completion of the new short-wave station at Chenju, which is expected to be ready shortly.

Fully Automatic Tube Lifts

AS a result of experience gained from the lifts installed at the Earl's Court Station in October, 1932, the London Passenger Transport Board has just equipped three of the four lifts at the Strand Station with completely automatic control of an entirely new and up-to-date design.

Small relays similar to those used for automatic telephones are employed for the primary control, most of the components being standard products. The design of the controlling circuits has been prepared by the Board's staff in collaboration with the various manufacturers concerned.

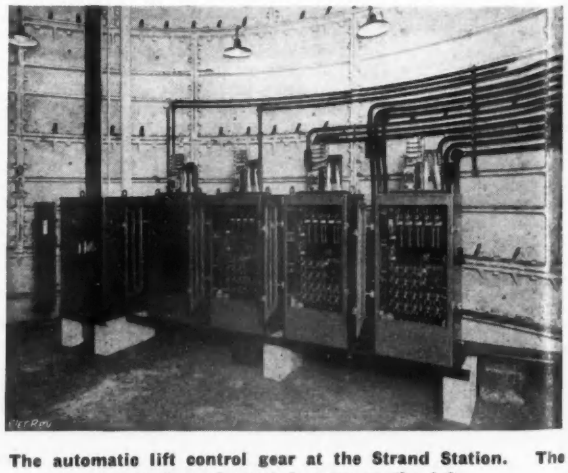
Upon a lift arriving at a landing the exit doors open, allowing passengers to leave. After a suitable interval the entrance doors open, allowing other passengers to enter. An illuminated warning sign is then exhibited above the exit doors, and at the same time a concealed loudspeaker warns passengers to "Stand clear of the gates!" After an interval of fourteen seconds similar warnings are given at the entrance doors, which then close. The lift then proceeds immediately to the other landing, where the same cycle of operations is repeated.

One, two or three lifts can be operated at the same time, and they automatically space themselves to give a regular time interval. With one lift in operation the same service from either landing is once per 110 seconds. Two lifts reduce this time to 55 seconds, and three lifts to 37 seconds.

Elaborate safety and warning devices are provided in addition to those usually fitted to the Board's lifts. For example, should the doors fail to close at the correct time, the lift stop between landings, or a passenger operate the alarm switch, a warning bell draws the attention of the station staff. The alarm switch, besides ringing the bell, causes the lift, upon reaching the landing, to open its doors immediately and remain open until it has received attention.

If for any reason the door warning sign fails to operate the doors do not close and the staff is informed by a bell. Several other devices check the operation of the control gear.

The apparatus for providing the verbal warning at the landings was designed at the Board's own offices. It consists essentially of a strip of film fitted to a drum which rotates at a constant speed, and the standard form of speech track and photo-cell control supplies signals to an amplifier which, in turn, feeds the loudspeakers.



The automatic lift control gear at the Strand Station. The speech equipment is seen on the left

Contract Information

When "Contracts Open" are advertised in our "Official Notice" pages the date of the "Electrical Review" containing the advertisement is given in parentheses below

Contracts Open

Aberdeen.—June 17th. Electricity Department. Two water-tube boilers. (May 24th.)

Australia.—SYDNEY.—August 12th. Municipal Council. 11,000-V oil-immersed isolating and earthing switches. (A.Y. 13087.)*

Beckenham.—June 24th. U.D.C. Coal supply. (See this issue.)

Belfast.—June 11th. Electricity Department. 11-kV outdoor type switchgear, transformers, &c. (See this issue.)

Belgium.—BRUSSELS.—June 22nd. Two mercury rectifiers and one static transformer for the Brussels Port sub-station. Société du Canal et des Installations Maritime de Bruxelles, 59, Rue du Canal.

Birmingham.—Electric Supply Department. June 14th. E.h.p. and l.p. cables. May 17th.)

Bolton.—June 11th. Housing Department. Electrical installations in 174 houses, bungalows, and flats. (See this issue.)

Brentford & Chiswick.—June 12th. Electricity Department. E.h.p. and l.p. cables, l.p. feeder pillars, e.h.p. kiosks, transformers and switchgear. (May 24th.)

Bridlington.—June 12th. Corporation. Meters, fuse and joint boxes, and lamps, for the period ending March 31st, 1936. (See this issue.)

Bristol.—June 14th. Airport Committee. Shadow-bar floodlight, illuminated wind indicator, cable connections and wiring and control switches for the airport. (May 24th.)

Carlisle.—June 17th. City Council. Electrical installations in 196 houses. City surveyor, 18, Fisher Street.

Chartham (near Canterbury).—June 11th. Kent County Mental Hospital. Electric wiring of sixty-four cottages and farm bailiff's house. (May 24th.)

Chile.—SANTIAGO.—June 24th. Ministry of National Defence. Electric travelling portal cranes for the Port of Iquique. (A.Y. 13057.)*

Clyde.—June 8th. Navigation Trust. Electrical stores. Stores superintendent, No. 1 Graving Dock, Govan.

Croydon.—June 21st. Electricity Department. Stores and materials for the year commencing August 1st. (See this issue.)

Dartford.—June 11th. Corporation. 11-kV cable and joint boxes. (See this issue.)

Doncaster.—June 8th. Borough Council. Electrical installations in seventy-three houses. Borough engineer, 2, Priory Place.

June 5th. West Riding Education Committee. Electric lighting installation at Rossington Council school. A. J. Dempster, divisional clerk, Winchester House, Scot Lane.

Downpatrick (Co. DOWN).—June 7th. R.D.C. Electric motors and pumps for Killyleagh waterworks. R. J. Carr, clerk, R.D.C. offices (deposit £1 1s.).

East Grinstead.—June 14th. U.D.C. Electric cookers. (See this issue.)

Edinburgh.—June 10th. Electricity Department. Extensions to water circulating system at Portobello station. (See this issue.)

Egypt.—CAIRO.—July 18th. Ministry of the Interior. Sub-station equipment, transmission lines, telephone lines, cables, distribution pillars, transformers, &c. (A.Y. 13059.)*

June 29th. Public Works Ministry. Electrical material, including lamps, insulators, fuses, meters, battery plates, street lanterns and poles. (A.Y. 13091.)*

Grimsby.—June 5th. Electricity Department. 11-kV switchgear. (May 24th.)

Hawarden.—June 12th. R.D.C. Prepayment and ordinary type meters. (May 24th.)

Electricity Department. Four 11-kV 400-V transformers. (See this issue.)

Heston and Isleworth.—June 6th. Electricity Department. Cable, transformer and switchgear. (May 24th.)

India.—July 2nd. India Store Department. Indoor and outdoor switchgear. (See this issue.)

June 12th. Bombay, Baroda and Central India Railway Co. Copper wire. (See this issue.)

Irish Free State.—MALLOW.—June 22nd. North Cork Board of Health and Public Assistance. Electric lighting and power services in the new County Hospital. D. C. Murphy, Secretary's Office, County Hospital (deposit £20).

Kingston-on-Thames.—June 14th. Town Council. Street fire alarm system. (See this issue.)

Lincoln.—June 7th. Electricity Department. One 13-panel 250,000-kVA control board. (May 17th.)

London.—FULHAM.—June 24th. Borough Council. For the extension of Townmead Road power station:—Section "A.A.": Two storage batteries of 1,000 and 50-Ah capacity respectively with motor-generator, rectifiers, &c. Section "A.B.": Boiler-house auxiliaries comprising electrically driven forced and induced draught and secondary air fans, with control apparatus, switchgear, &c. Borough treasurer, Town Hall (deposits of £5 for section "A.A.," and £10 for section "A.B."

June 24th. Borough Council. Coal conveying plant and cable. (See this issue.)

METROPOLITAN WATER BOARD.—June 17th. Electric lamps for periods of six and twelve months commencing August 1st (tender No. 24). Chief engineer, Offices of the Board, 173, Rosebery Avenue, E.C.1.

DEPTFORD.—June 26th. Borough Council. Electrical installations in 110 houses on Brockley Estate. (See this issue.)

BETHNAL GREEN.—June 18th. Borough Council. Installation of rising mains at tenement buildings. (See this issue.)

Manchester.—Electricity Committee. June 3rd. Batteries and charging gear. (May 24th.)

Middlesbrough.—June 17th. Electricity Department. Twelve months' supply of 660-V cable. (See this issue.)

Newcastle-on-Tyne.—City Council. Electric lighting at the Rutherford College Girls' school. T. Walling, director of education, Northumberland Road.

New Zealand.—WELLINGTON.—July 17th. Post and Telegraph Department. 5,000 telephones. (A.Y. 13080.)*

Nottingham.—June 4th. Electricity Committee. General Stores for one year from July 1st next. (May 17th.)

Oldham.—June 1st. Electricity Committee. Transformers. (May 17th.)

Portsmouth.—June 3rd. Electricity Department. Six months' supply of p.i. and r.i. cables. Contracts and Supplies Section, City Treasurer's Department, Guildhall.

South Africa.—PRETORIA.—June 21st. Union Tender and Supplies Board. Stationary battery for automatic telephone exchange, Port Elizabeth. (A.Y. 13076.)*

GRIQUATOWN.—Municipality. July 4th. Electrical generating plant, switchgear, distribution and consumers' equipment. (A.Y. 13089.)*

JOHANNESBURG.—City Council. June 20th. L.p. metal-clad switchgear. (A.Y. 13086.)*

Railways and Harbours Administration. July 15th. Fourteen electrically driven jib cranes for Port Elizabeth harbour. (A.Y. 13090.)*

Sutton Coldfield.—June 12th. Electricity Department. 11-kV overhead line, complete with pole-mounted switches, transformers and l.p. equipment. (May 24th.)

Wallasey.—June 17th. Corporation. Cables and meters for the year ending June 30th, 1936. (See this issue.)

Walton and Weybridge.—June 17th. Electricity Department. One 300-kVA transformer. (See this issue.)

West Ham.—June 13th. Education Committee. Electric lighting of proposed new trade school. (May 24th.)

West Hartlepool.—June 13th. Electricity Department. H.p. and l.p. cables for twelve months. (See this issue.)

Wolverhampton.—June 7th. Electricity Department. Truck type switchgear. (See this issue.)

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* Further particulars can be obtained at the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, London, S.W.1.

Contracts Closed

Aberdeen.—Housing Committee. Accepted. Electric lighting at the Craiginches housing scheme (£928).—A. H. Shaw.

Bexhill.—Electricity Committee. Recommended. Conversion of wireless apparatus, &c., in connection with the change-over (£626).—Supremus Specialities, Ltd. Transformers.—British Electric Transformer Co., Ltd. (£123); Lindley Thompson Transformer Co., Ltd. (£720).

Blackpool.—Electricity Committee. Accepted. Meters.—British Electric Meters, Ltd.; Measurement, Ltd.; Ferranti, Ltd.; Aron Electricity Meters, Ltd.; Landis & Gyr, Ltd.

Bury St. Edmunds.—Education Committee. Accepted. Electric lighting at new senior schools (£650).—R. H. Lee.

Croydon.—Highways Committee. Recommended. Re-arrangement of fire alarm system (£926).—Standard Telephones & Cables, Ltd.

Electricity Committee. Recommended. Switchgear (£10,957).—Metropolitan-Vickers Electrical Co., Ltd.

Ealing.—Town Council. Accepted. House service meters (£1,100).—Ferranti, Ltd. L.p. cable (£2,058).—Enfield Cable Works, Ltd.

Exeter.—Electricity Committee. Accepted. Seventeen transformers (£1,727).—Yorkshire Electric Transformer Co., Ltd. 600 electric cookers (£5,042).—Jackson Electric Stove Co., Ltd. 300 electric water heaters (£2,038).—Aidas Electric, Ltd.

Grimsby.—Electricity Committee. Recommended. Two 2,000-kVA transformers (£2,535).—Brush Electrical Engineering Co., Ltd.

London.—BROMLEY.—L.C.C. Accepted. Electric fire alarm system at Poor Law Institution (£406).—T. Clarke & Co., Ltd.

L.C.C.—Education Committee. Accepted. Electrical installation at Brixton School of Building (£2,922).—Buchanan & Curwen, Ltd.

Housing and Public Health Committee. Accepted. Electrical installations: Clapham Park Estate (£2,061).—Jacob, White & Co., Ltd. Dinmont Estate, Bethnal Green (£654) and Mottingham Estate (£2,223).—E. Dyne & Co., Ltd. Drysdale Street area, Shoreditch (£872).—F. Angell & Co., Ltd. Honor Oak Estate (£1,608) and Lilestone Estate, St. Marylebone (£605).—Holliday, Hall & Stinson, Ltd. Wenlake Buildings, Finsbury (£678).—Coleby & Co., Ltd.

Mental Hospitals Committee. Accepted. Electric lighting, telephones and fire alarms at Colney Hatch Mental Hospital (£736) and installation of automatic telephone system at Fountain Mental Hospital (£528).—Keeble, Ltd. Electrical work at the Ewell Mental Hospital extension (£3,265).—T. Clarke &

Co., Ltd. Electrical work at the extension of Maudsley Hospital (£2,155).—W. J. Furse & Co. (London), Ltd. Electrical installation and renewal of cables (£1,908) and extension of wireless installation (£500) at the Tooting Bec Hospital.—Malcolm & Allan, Ltd.

POPLAR.—Electricity Committee. Recommended. Water heaters.—Aidas Electric, Ltd. (£225); Ferranti, Ltd. (£220); Drake & Gorham, Ltd. (£227). Two feeder panels for the North sub-station (£574).—A. Reyrolle & Co., Ltd. Superheater for Glaucus Street station (£580).—J. Thompson & Co., Ltd. Testing apparatus.—British Sangamo Co., Ltd. (£139).

ST. MARYLEBONE.—Electricity Committee. Recommended. Cables for twelve months.—Telegraph Construction & Maintenance Co., Ltd.; British Insulated Cables, Ltd.; Enfield Cable Works, Ltd.

STEPNEY.—Electricity Supply Committee. Recommended. Distribution switchboard (£830).—Johnson & Phillips, Ltd. Three banks of 880 A reactors (£948).—Metropolitan-Vickers Electrical Co., Ltd. This was the lowest of five tenders, the highest being £1,968.

WESTMINSTER.—General Purposes Committee. Accepted. Council chamber floodlighting.—Allom Bros. & Co., Ltd. (£141); Drake & Gorham, Ltd. (£55).

Mexborough.—U.D.C. Accepted. Twelve months' supply of p.i. cables.—British Insulated Cables, Ltd.

Richmond (SURREY).—Town Council. Accepted. Electrically driven pumping plant for the new well at Ham Common.—Worthington-Simpson, Ltd.

Stourbridge.—Worcestershire C.C. Accepted. Electric lighting at cottage homes (£166).—T. R. Priest.

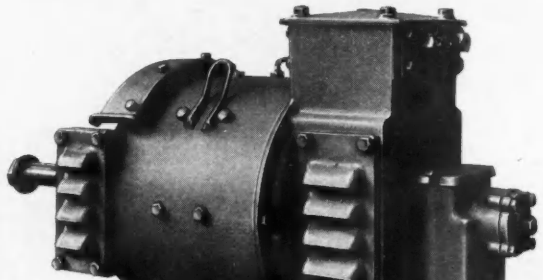
Weymouth.—General Purposes Committee. Accepted. Electrical equipment for Alexandra Gardens Theatre (£100).—Strand Electric & Engineering Co., Ltd.

Electricity Committee. Accepted. L.p. cable (£2,212) and 11,000-V switchboard cubicle (£105).—Johnson & Phillips, Ltd. 750-kVA transformer (£275) and four-panel l.p. switchboard (£115).—English Electric Co., Ltd.

Notes

The " Normandie "

With reference to the description of the electrical equipment of the French liner *Normandie* which appeared in our last issue it is of interest to learn that about 160 d.c. motors with an aggregate capacity of 1,500 h.p., ranging from 3 to 17 h.p., were supplied by the General Electric Co., Ltd. These machines are employed for the operation of the ventilating



Elec Rev

One of the " Witton " motors supplied to the " Normandie "

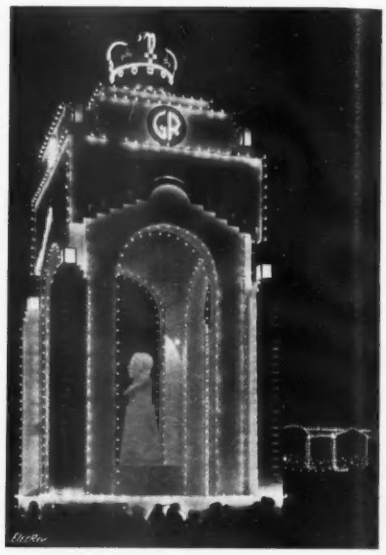
equipment by Thermotank, Ltd., for dealing with 3,500 tons of air per hour. " Witton " motors (one 10 h.p. and one 7½ h.p.) are also used with G.E.C. automatic pressure-operated starters for driving pumps and an air compressor in connection with the hydraulically controlled bulkhead doors.

Electricity Supply in the Irish Free State

In the course of a paper read in Dublin on May 25th before the Irish Local Government Officials' Union, Dr. T. A. McLaughlin, of the Irish Free State Electricity Supply Board, stated that during the past five years the total number of consumers had doubled. The sale of electricity for all purposes was now more than twice as much, while, excluding Dublin and Cork, it had increased five-fold. Since the change-over from local generation to the national supply in every case there had been a remarkable increase, not only in the total consumption in the town, but even more marked in the usage per consumer. There was now no town of over 1,500 population without electricity, and extensions of the Shannon system were tending to include more and more of the small villages. The present total industrial load amounted to approximately 60,000 h.p., compared with 30,000 h.p. four years ago. Hitherto only 25 per cent. of the load was outside Dublin and Cork, whereas to-day 40 per cent. was in other areas. Were it not for the national network the efforts which were being made to decentralise industry would be much more difficult. Small pumping plants were being installed in the villages of Askeaton (pop. 550), Bruff (pop. 400), Croom (pop. 450), and Hospital (pop. 550), which were so small that any other method of water supply would have proved uneconomic. Local authorities were concerned with large-scale institutional cooking, and in Dublin in the last few years some of the principal hospitals had turned over to electric cooking.

The Jubilee in South Africa

We have received by air mail from Mr. L. L. Horrell, the city electrical engineer of Pretoria, some photographs and particulars of the Jubilee illuminations in that city. Pretoria is fortunate in having a square in the centre of the business area and admirably adaptable for decoration by ornamental lighting. On the occasion of the Jubilee a particularly effective and striking scheme was designed to include the square itself and the surrounding imposing buildings. The suitable buildings were floodlighted in colours and the remainder were lined with strings of coloured lights. The decoration of the central lawns was undertaken by the Council's Electricity Department with a central decorative tower and strings of coloured lights encircling the lawns. The centre tower, 55 ft. high, was illuminated in red and white with four large corner columns united at the top by arches to form a platform supporting an illuminated crown. A bust of the King about 4 ft. in height was mounted on a pedestal in the space under the arches, and when illuminated presented a striking effect as can be seen from the illustration. The bust was made by Mr. Cutler, a member of the Department's staff.



The centre of the Pretoria illuminations

A Mines Inspector's Report

The Secretary for Mines announces the publication of Mr. W. E. T. Hartley's report for the year 1934 on the inspection of mines in the Midland and Southern Division, in which coal cut by machines was six million tons compared with just over five million tons during the previous year. An underground fire which occurred at Pooley Hall Colliery was not at first thought to be serious, but it spread with extreme rapidity owing to the difficulty of extinguishing burning electric cable close to a switchbox, and caused the deaths of two men. Mr. Hartley discusses the effect of the new general regulations governing mine lighting and in view of the importance of the proper handling of lamps reproduces instructions as to the care of electric safety lamps which are issued to all new employés at a South Staffordshire colliery. Information is given on such subjects as the use of electricity and explosives. Copies of the report (post free 1s. 2d.) can be obtained from H.M. Stationery Office, Kingsway, London, W.C.2.

Appointments Vacant

Draughtsmen for the R.A.F. Establishment, South Farnborough.

Cost clerk and accountancy assistant for West Hants Electricity Co., Ltd.

Technical assistant electricians and assistant electricians for the Metropolitan Police.

(See our classified advertisements.)

Forthcoming Events

National Electrical Convention.—Monday, June 3rd, to Friday, June 7th. Bournemouth.

Associated Municipal Electrical Engineers.—Tuesday, June 4th. Popular Restaurant, Bournemouth. 3.30 p.m. Annual general meeting.

Tramways and Light Railways Congress.—Wednesday and Thursday, June 5th and 6th. Llandudno.

Makers' Names Wanted

CASSELL vacuum cleaner.

Our Personal Column

Electrical men are invited to keep readers of the "Electrical Review" posted concerning their movements

Sir **Holberry Mensforth,** K.C.B., C.B.E., has notified the board of Edmundson's Electricity Corporation, Ltd., of his desire to be relieved of the chairmanship and executive control of the company and its subsidiaries, as he finds it necessary, after many years of work, to have more leisure. The board has accepted this decision with regret, but Sir Holberry will remain a member of Edmundson's board and also those of its subsidiaries upon which he at present serves. In the meantime the deputy chairman, Brig.-Gen. W. H. Hayes, will act.

Col. R. E. B. Crompton celebrates his ninetieth birthday to-day (Friday), and a banquet in his honour is being held at the Savoy Hotel this evening at which over 500 guests are expected to be present.

Mr. H. G. Mackerron, of Messrs. Mackerron & Scott, Ltd., Glasgow, was elected president of the Electrical Contractors' Association of Scotland at the annual meeting of the Association on May 25th at Taymouth Castle, Perthshire.

Mr. O. D. Williams, A.M.I.E.E., of the electrical staff of Pearson & Dorman Long, Ltd., at Betteshanger Colliery Kent, has been appointed charge engineer at the power station of the First Garden City Co., Ltd., Letchworth.

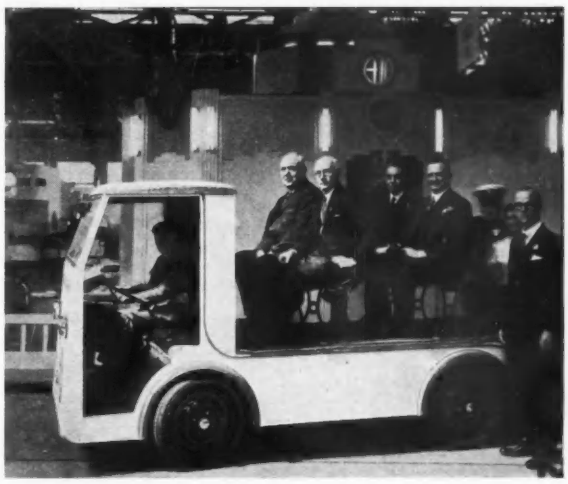
On May 22nd a pleasing ceremony took place at the Salford Works of Messrs. Frederick Smith & Co. (incorporated in the London Electric Wire Co. & Smiths, Ltd.). The chairman of the company, Mr. W. J. Terry, presented gold watches to two of the employés who had records of over fifty years' continuous service, namely, **Mr. J. A. Mitchell,** who commenced

Mr. W. J. Terry presenting gold watches to Messrs. J. A. Mitchell and H. Greenwood at the Salford works of Messrs. F. Smith & Co.

in 1882, and **Mr. Harry Greenwood,** who started in 1884. In making the presentation Mr. Terry paid a tribute to the work of these two gentlemen, comparing them to cricketers who had each achieved a fine innings and were still "not out." Gold chains were also presented to Messrs. Mitchell and Greenwood by Mr. A. Noel Smith and Mr. H. F. Smith, two of the company's directors.

Messrs. Crompton Parkinson, Ltd., and their associated companies will be represented at the National Electrical Convention, Bournemouth, by Messrs. E. C. Holroyde (director), T. W. Fairhurst (general sales manager), T. H. Windibank (lamp sales manager), and J. R. A. Bull (switchgear and transformer engineer), of Crompton Parkinson, Ltd.; Messrs. B. H. Garside (assistant managing director) and E. E. Garrard (London manager), of Derby Cables, Ltd.; and Mr. F. E. Berry, director of the British Electric Transformer Co., Ltd. Mr. Holroyde, in his capacity as a member of the B.E.A.M.A. Council, will also represent that Association at the Convention.

Mr. S. M. Richardson, sub-accountant of the Melbourne and Metropolitan Tramways Board, has been appointed assistant manager of the undertaking, in succession to **Mr. C. W. Young,** who will retire in July. Mr. Richardson, who has been in the service of the Board since 1911, joined the staff of the Melbourne Tramway & Omnibus Co. in 1891, and became an officer of the Board when it assumed control of the tramways.



Visitors to the British Industries Fair, Birmingham

Left to right: Mr. P. J. Robinson, city electrical engineer, Liverpool, and chairman of E.D.A.; the Lord Mayor of Birmingham; Mr. E. E. Hoadley, borough electrical engineer, Maidstone, and president of the National Electrical Convention; and Sir William Ray, M.P., executive chairman of E.D.A., in an electric vehicle at the E.D.A. kiosk

Mr. H. Harrison, of Bolton, has been appointed mains engineer to the Tynemouth Electricity Department at a salary of £470 per annum. He will commence his duties on July 1st.

Obituary

Mr. H. T. Boothroyd.—We regret to record the death on May 22nd of Mr. H. T. Boothroyd at the age of sixty-eight years. On his retirement from his electrical business in Liverpool several years ago Mr. Boothroyd went to South Africa, but subsequently returned to England.

Mr. G. Robinson, of Messrs. Hulme & Sons, Derby, died suddenly on May 24th at the age of fifty-four.

Mr. G. H. Cox.—The death occurred on May 25th at the age of eighty-seven of Mr. George Henry Cox, who was on the board of the Salt Union, Ltd., which controls the Mersey Power Co., Ltd.

M. Ch. Fery.—The death recently occurred in Paris, at the age of sixty-nine years, of M. Charles Fery, a well-known French scientist, who for twenty-four years occupied the Chair of Optics at the Paris School of Physics and Industrial Chemistry. The deceased was also a leading authority on primary batteries and accumulators.

Mr. Edwin L. Beck, who retired two years ago from the post of manager of the Newcastle-upon-Tyne office of the British Thomson-Houston Co., Ltd., has died at Corbridge (Northumberland). He had been manager for the company for thirty-two years, and, as an electrical engineer, travelled extensively in England and abroad. He was largely responsible for the electrification of the first cotton spinning mill at

Representatives of Crompton Parkinson, Ltd., and associated companies who will attend the National Electrical Convention

Left to right: Messrs. J. R. A. Bull, T. W. Fairhurst, E. C. Holroyde, E. E. Garrard and B. H. Garside

Swinton, Lancashire. He was also associated with the scheme for the electrification of the Newcastle-Whitley Bay railway.

Mr. S. H. Fase.—We regret to announce the death of Mr. S. H. Fase, who was district engineer to Callender's Cable & Construction Co., Ltd., for Hove and Worthing, on May 13th, aged fifty-seven, at his home in Hove; he was cremated at Brighton on the 16th. Mr. Fase joined the company in 1898, but left in 1904 to take up another appointment. He rejoined in 1924, and was with Callender's until his death, having been in charge of the Hove district for nine years.

Mr. H. Gregg.—We also regret to record the death of Mr. H. Gregg, another Callender district engineer, who died at the age of sixty-three and was buried at Marylebone Cemetery on May 13th. He was with the company from February, 1914, until January, 1934, a period of twenty years and joined on the recommendation of the late Mr. J. O. Callender. He carried out several G.P.O. contracts in the South of England, but his main work was in the Doncaster area. During his last four years with Callender's he was engaged in laying e.h.p. cables in the London District.

Financial Section

New Companies, Returns of Share Capital, Debenture Charges, Reports of Electrical Companies, Dividend Changes, Transactions in Stocks and Shares

New Companies Registered

R. Batten & Son, Ltd.—Private company. Registered May 25th. Capital, £2,000 in £1 shares. Objects: To acquire the business of electrical and radio engineer now carried on by Ronald Batten at 174, Union Street, Torquay, as "Ronald Batten," electrical and radio engineer. The directors are: R. Batten (chairman), "Fontenay," Cleveland Road, Torquay; and Mrs. Annie Batten. Solicitor: W. E. Stabb, National Provincial Bank Chambers, 106/110, Union Street, Torquay.

John Godden (London), Ltd.—Private company. Registered May 21st. Capital, £3,000 in £1 shares. Objects: To carry on the business of electrical, mechanical and general engineers, founders, smiths, machinists, electricians, electrical wiring contractors, manufacturers, wholesalers and retailers of electrical and mechanical apparatus, &c. The subscribers are: F. J. Godden, 20, Hillside Gardens, Wallington, Surrey; and F. Woodward, 32, Huron Road, Balham, S.W.17. Secretary: F. Woodward. Registered office: Cranmer Court Works, High Street, Clapham, S.W.4.

Abbott & Hawkins, Ltd.—Private company. Registered May 20th. Capital, £1,000 in £1 shares. Objects: To carry on the business of manufacturers of and wholesale and retail dealers in electrical goods of all kinds, electric accumulators and batteries, cookers, &c. The permanent directors are: J. R. V. Webb, Trelawney, Blackwood, Mon., and two others. Registered office: 50, Charles Street, Cardiff.

E. A. Devine, Ltd.—Private company. Registered May 22nd. Capital, £1,000 in £1 shares, 600 5 per cent. cumulative preference. Objects: To acquire the business heretofore carried on by R. H. Knox at Alnwick, Northumberland, as "Knox Brothers," and to carry on the business of manufacturers, importers and exporters of and dealers in wireless apparatus, cabinets, loud speakers, receiving and transmission sets, &c. The first directors are: E. A. Devine and Catherine Devine, both of "Deganwy" The Dunterns, Alnwick, Northumberland. Registered office: 27, Bondgate Within, Alnwick, Northumberland.

Hooley & Matthews, Ltd.—Private company. Registered May 24th. Capital, £400 in £1 shares. Objects: To acquire the business of electrical and wireless engineers and contractors carried on by Norman Hooley and Wilfred Matthews as "Hooley & Matthews" at 63, Astley Street, Dukinfield. The directors are: N. Hooley, 124, Cheetham Hill Road, Dukinfield, and two others. Secretary: N. Hooley. Registered office: 63, Astley Street, Dukinfield.

Robert Beyer Industrial Inventions, Ltd.—Private company. Registered May 23rd. Capital, £100 in £1 shares. Objects: To carry on the business of manufacturers of and dealers in rubber, synthetic rubber, caoutchouc-like material and vulcanised products, bricks, monolythic bricks, tiles, cold glazed tiles, pipes, pottery, earthenware, china, terra cotta and ceramic ware of all kinds, building materials, electric vacuum furnaces, electrical resistances, heating elements, and other electrical apparatus, &c. The first directors are J. De Wyckoff and Dr. R. Beyer. Registered office: 2, Clements Inn, Strand, W.C.2.

Returns of Electrical Companies

Harrison & Norris, Ltd.—Mortgage debenture dated May 10th, 1935, to secure £240, charged on the company's undertaking and property, present and future, including uncalled capital and unpaid calls. Holder: Mrs. Lydia Mainwaring, Heber Lodge, Northumberland Road, Leamington Spa.

W. & F. Wills, Ltd.—Satisfaction to the extent of £2,800 on March 26th, 1908, of series of debentures authorised by resolution dated March 25th, 1901, and registered October 4th, 1901. (Notice filed May 20th, 1935.)

Abbey Electrical Co., Ltd.—Capital, £500 in £1 shares. Return dated December 31st, 1934 (filed May 1st, 1935). 390 shares taken up. £390 paid. Mortgages and charges, nil.

Aladdin Industries, Ltd.—The nominal capital has been increased by the addition of £40.000 in £1 ordinary shares beyond the registered capital of £80,000.

E. & W. Shepherdson, Ltd.—Satisfaction to the extent of £350 on May 1st, 1935, of debenture dated January 9th, 1929, and registered January 15th, 1929.

Bondmag, Ltd.—Particulars filed of debentures not exceeding £200 authorised April 18th, 1935, charged on the company's property, present and future, including uncalled capital, the amount of the present issue being £200.

City Notes

Siemens Bros. & Co., Ltd.—The accounts of this company were abstracted in our issue of May 24th, p. 767. The annual meeting took place on May 27th, when Lord Queenborough (chairman), who presided, in reviewing the balance sheet, made special reference to the 4½ per cent. debenture stock, of which £490,300 was outstanding, and which would be redeemed out of the resources of the company on July 15th next, thus freeing the company from debenture obligations. During the past year the contract was obtained for laying a submarine telephone cable across the Bass Straits to link the telephone systems of Tasmania and Australia. This cable would complete the establishment of communication between the six states of the Commonwealth and extend the range of the Anglo-Australian radio service. The cable was over 160 nautical miles in length and provided for the simultaneous operation of at least five telephone conversations, a broadcast programme, and seven high-speed telegraph channels over a single conductor. To achieve this the cable would have to operate over a frequency range up to 42,000 cycles per second, and this was much in advance of anything hitherto attempted. A contract was also received for 33,000-V underground cables for the West of England electricity distribution scheme. Their telephone cable-making plant was kept busy throughout the year and was still fully employed, underground cables, complete with loading coils and cases, being laid between Newcastle and Carlisle. Amongst contracts for telephone exchanges in the London area were Sydenham, Stepney and Feltham, as well as extensions to equipment at Ilford and Mitcham. Contracts for new exchanges and equipment for the provinces included Birmingham, Chertsey, Cupar (N.B.), Eastleigh, Edinburgh, Guernsey, Great Yarmouth, Leith and Sheffield, also trunk exchanges for Grimsby and Birmingham. The latter would rank as one of the largest and most important trunk exchanges in the United Kingdom. Automatic telephone exchanges for the London Passenger Transport Board had also been supplied. Overseas they were providing new exchanges or extensions to equipment at Sandakan (North Borneo), Valletta and St. Paul's Bay (Malta), Salisbury (Southern Rhodesia), Brazil, seven rural automatic exchanges for Australia, and an automatic exchange for Muizenberg (Cape Town). Substantial orders had been placed by the Post Office, the Union of South Africa, and other overseas administrations for the company's "Neophone" instruments. They had manufactured 137 rural automatic exchanges during the year, twenty of which were capable of extensions up to 800 lines, and sales, rental and maintenance of private equipment had been encouraging. Legalisation of the use of electric totalisators had revived business in this direction. To the order of their associated company, Siemens and General Electric Railway Signal Co., Ltd., traffic-control equipment of the vehicle-actuated pattern had been manufactured, and equipment which would form a part of the largest flexible progressive traffic-control system in the world was at present being made. Marine apparatus sales were still well maintained, and an order had recently been received for engine room telegraphs for the *Queen Mary*. Their overseas trade had definitely improved, the value of orders being up by about 50 per cent. on the figures of 1933. The price level, however, remained unsatisfactory. Siemens Electric Lamps & Supplies, Ltd., continued to show satisfactory results. The outlook for the present year was distinctly encouraging and orders received so far this year were in excess of those received for the same period last year. Moreover, a large number of uncompleted orders had been brought forward. In answer to a point raised by ordinary shareholders as to the desirability of getting rid of the burden of the 10 per cent. preference shares, the chairman said that if at a future date an amalgamation of the company's business with its subsidiary companies were found financially convenient and advantageous, the holders of the 10 per cent. preference shares would only be entitled to be repaid the nominal amount of their shares in priority to the ordinary share capital. In such an event their preference shareholders would be given the fullest opportunity of sharing in the future of the company.

The North-Eastern Electric Supply Co., Ltd.—Underwriting was arranged on Tuesday last for an issue of £1,500.000 of debenture stock of the company which Messrs. Lazard Bros. & Co. were on offer yesterday (Thursday). The new stock will carry interest at 3½ per cent. and will rank *pari passu* with the existing 5 per cent. and the 3½ per cent. consolidated debenture stocks; it was offered at par. The proceeds of the issue will be used to meet expenditure incurred in connection with the continuing development of the company's system and in repaying temporary loans.

Cable & Wireless (Holding), Ltd., held its annual meeting on May 24th, Mr. J. C. Denison-Pender (governor) presiding. In presenting the report and accounts (ELEC. REV., May 24th, page 767) the chairman said the world position was constantly under observation with a view to increasing the traffic receipts of Cable & Wireless, Ltd. New offices had been opened in various places, and additional agents had been appointed. Canvassing had been extended, publicity developed and new services inaugurated. In spite of all this there had been a considerable decrease in expenditure. The number of wireless stations in foreign countries had increased considerably. Rate

reductions to meet those of competing services had had an effect upon their income, and to some extent also the air mail had affected some of the cheaper classes of traffic. With regard to new services the outstanding development of the year was the facsimile, or picture circuit, between London and Melbourne which was opened in October. On the technical side the work of research and development was constantly proceeding, and steady progress had resulted in increased speed and efficiency, with greater economy of working, throughout the cable and wireless branches of the system. Automatic repetition of signals on the Verdun principle had been successfully applied to the Indian wireless circuit to combat the effects of fading and of atmospherics. The position in foreign countries where telegraph concessions were held by Cable & Wireless and the companies under its control was becoming increasingly difficult. These countries were establishing wireless stations under their own control, the result being an overdevelopment of telegraphic facilities which could only lead to an uneconomic position, involving loss to those who undertook these limited services. Their cable repairing ships had been fully occupied, and between them had covered about 164,000 miles during the year. Admiral Grant had brought back a concession from the Hedjaz Government embracing the whole of the Saudi-Arabia, covering communications with the exterior both by cable and wireless. Regarding the prospects of further dividends, the consolidation of their improved position, which must take the form of a steady and continued increase in traffic receipts, was dependent upon wide international factors which were not under their control. Furthermore, the political and economic relations between the nations of the world were not yet such as to ensure that there would be no disturbance of that process of recovery on which the future of their company depended. If, however, there was no alteration for the worse in the international trade position and the gold bloc situation there was every hope that next year the results would show further improvements on this year's figures.

Marconi's Wireless Telegraph Co., Ltd., held its annual meeting on May 23rd. Lord Inverforth (chairman), who presided, in presenting the report and accounts (ELEC. REV., May 24th, p. 767) said that the increase of profit in 1934, as compared with the previous year would have enabled them to pay a higher dividend if it had been advisable to do so, but they proposed to maintain the distribution at 6 per cent., and to appropriate £78,000 to meet any contingencies that might arise. Many of the countries in which they did business were not showing those signs of recovery which had been conspicuous in Great Britain. More than 80 per cent. of their manufactured products were sold to foreign countries and in view of the unsettled conditions existing in so many directions, it behoved them to exercise prudence and to conserve their resources. Some years ago, when there existed a general scepticism regarding the practical possibilities of television they had had the foresight to incur heavy expenditure on research, not only to produce transmitting apparatus but also to study the question of receiving sets with a view to licensing manufacturers in this field. As a result, they had taken out patents for mechanical, optical, cathode-ray, valve, radio, and time-base circuits and aerial devices, and to-day they were in a position to offer complete stations to those interested in television transmission and to grant licences for the use of their patents to the manufacturers of receiving sets. They had combined with Electric & Musical Industries, Ltd., to form the Marconi-E.M.I. Television Co. for the production and sale of television transmitters. The chairman denied that other countries were ahead of us in television development. The company was ready to supply transmitters capable of providing a public service of high definition television with 405 lines and fifty pictures per second. They must be prepared for further heavy research expenditure to improve and develop this new art. Research must also be continuous in all branches of wireless telegraphy and telephony, and it was their settled policy to incur the expenditure required for the adequate maintenance and necessary extension of this basic activity of the company. They were now ready to reinforce their technical staff by engaging a number of probationers chosen from the universities and technical colleges.

Broadcast Relay Service, Ltd.—Presiding at the annual meeting held on May 22nd, Sir H. Brent Grotrian, Bt. (chairman) said that when the company was converted into a public one and an issue of 7 per cent. debentures was made, their operations were confined to Hull and one or two small towns. Since then they had extended their operations to Newcastle, Rotherham, Wallasey, St. Helens, Newport, Swansea, Margate, Whitby Bay and Gateshead. It was considered advantageous to convert the company into a holding company, and during the year two subsidiary companies were formed in Hull and the Isle of Thanet, to which the individual assets shown in the balance-sheet last year had been transferred. The number of subscribers at the end of March last was 37,426, an increase of over 10,000 during the past year. An agreement was being concluded between the company and the Governor of Malta for the establishment of a system in the island. This step might lead to further extensions of their business in other Colonies in the near future. They hoped to conclude negotiations for the development of the service in several large cities in the British Isles. The shareholders' approval would be asked for an increase of the share capital to enable the company to be in the position to take advantage of opportunities to extend its business and also at some future date to distribute part of the reserve to shareholders in the form of bonus shares. They anticipated that as soon as television was available in their areas they would be able to make this new service available. The report and accounts were adopted and a resolution for the increase of the authorised capital to £200,000 was carried.

Southern Areas Electric Corporation, Ltd., held its annual meeting on May 29th, when Viscount Elibank (chairman), who presided, said that the kWh sold by all their undertakings showed an increase of 63.6 per cent. during the past year. Development had been slow at Leominster and at Seaton, the latter having been occupied during the non-seasonal part of the year in changing over the d.c. system to a.c. To-day about 70 per cent. was completed. Similar work took place at Littlehampton and Crawley, where the change-overs were practically finished. Considerable sums had been expended at Seaton and Littlehampton for the development of the undertakings by extensions into new areas. The results for the year of the Salcombe Gas and Electricity undertaking were satisfactory and further development was contemplated in that part of Devon. In the latter half of 1934 they acquired 25,000 6 per cent. participating preference shares of Mawdsley's, Ltd., and so secured control of the business from July 1st last, and from that time received 6 per cent. interest on the shares. They also contracted to acquire the 14,013 ordinary shares in that company on or before December 31st, 1936. The acquisition was proving a very profitable investment and valuable adjunct to the development of their undertakings. The report and accounts were adopted and a resolution that the nominal capital of the company be increased by £500,000, bringing it up to £850,000, was approved.

Whitehall Electric Investments, Ltd., reports a net income of £214,472 for the year ended March 31st last (against £263,883). The preference dividend requires £187,500 and the balance forward is raised by £24,120 to £268,492. Again no dividend is declared on the ordinary capital. The report states that in Athens the operations of the Electricity Company have progressed favourably, and the financial results show a satisfactory recovery from those of the previous year. Sales of electrical energy increased during the year by 15,000,000 kWh to 97,000,000 kWh, and the number of consumers rose from 98,000 to 110,000. The new hydro-electric plant at Izbor, Spain, has been operating satisfactorily, and the sales during 1934 increased by 11,000,000 kWh, although progress is still slow owing to continued industrial depression and political trouble. The West of England companies have made further progress, the sales amounting to 12,000,000 kWh during 1934, and the number of consumers totalling 25,000.

The L.M. Ericsson Telephone Co. reports a net profit for 1934 of 136,313 kr., as compared with 93,000 kr. in 1933. It is proposed to utilise the whole of the profit to reduce the debit balance of 9,891,441 kr. brought in. According to the *Financial Times*, the board reports that the debts owing to the company by Kreuger & Toll and its associated companies have been reduced by 3,665,000 kr. during the year, partly owing to the sale of the Banque de Suède to a French buyer.

The Northampton Electric Light & Power Co., Ltd., is issuing to ordinary shareholders 145,000 ordinary shares of £1 each at 44s. per share. The shares will be allotted at the rate of one new share for every five shares held, and will rank for the final dividend of the current year. The list closes on June 18th.

The Lancashire Electric Light & Power Co. proposes to increase its capital to £3,571,415 by the creation of 400,000 ordinary shares of £1 each ranking *pari passu* with the existing 1,600,000 ordinary shares.

The Electrical Finance & Securities Co. has declared a final ordinary dividend of 5 per cent., plus a bonus of 2½ per cent., less tax, maintaining the distribution for the year at 12½ per cent.

Aron Electricity Meter, Ltd., has declared a final dividend of 10 per cent. (against 6 per cent.), making 15 per cent. for the year, as compared with 10 per cent. for the previous year.

Glenfield & Kennedy, Ltd., report that last year the net profit rose from £29,851 to £55,350. The ordinary final dividend is 7 per cent., making 10 per cent. for the year (against 7 per cent.). A sum of £8,413 goes to the staff pension fund and £61,782 is carried forward.

Herbert Morris, Ltd., have announced an interim dividend of 5 per cent. on their ordinary shares for the half-year to January 1st last. No interim dividend was paid in the previous year, but there was a final distribution of 10 per cent.

Stocks and Shares

TUESDAY EVENING.

THIS week there has been a real sensation in the Stock Exchange markets, an announcement by the Cable & Wireless directors having caused a dramatic rise in the prices of the preference and of the "A" ordinary stocks. The price of the preference had been about 90. It rose straightway to 97½. The "A" ordinary, which was standing about 20, jumped 5 points. The excitement has been continued during this present week. The prices are substantially better, the stock that was offered on Monday morning having been readily taken. It is more than banal journalese to say that keen interest awaits the next development. There is, of course, many a slip 'twixt cup and lip. If this were not so, the preference would be standing at three figures and the "A" would probably be over 30, for the way appears open to resumption of dividends in full on the preference stock by the combine. Less clearly, the chance of a distribution on the "A" ordinary stock comes into view. Globe Telegraphs & Trust are strong, in consequence of the jump in Cable & Wireless and the declaration of a 3½ p.c. dividend, against 2½ p.c. last year. In fact, telegraph stocks all round are inclined to be better. Great Northerns rose 30s. to 41½; Great Northern holdings are better at 11¼. Eastern Telegraph preference at 84¼ is 10s. up.

The Cable and Wireless Offer

Fuller details are promised for next Tuesday of the offer of purchase of Cable & Wireless preference. Meanwhile, lively discussion has been aroused as to whether holders of the preference stock will be well advised to take cash for one-third of their interest. If they do the probability is that the price of the preference will advance well over par, the prices of the ordinary stocks sympathetically improving. Acceptance of 100 for one-third of a proprietor's holding of preference stock implies a possible loss of capital appreciation, in days to come, on this particular part of the holding, while

the security for the remaining two-thirds of the stock is to some extent weakened. Regarded broadly, however, the scheme may be considered as wisely conceived, and its acceptance as advisable from the point of view of the investor in the preference stock. No doubt the details which have been promised for next Tuesday will elucidate the minor points upon which hesitation may be felt in arriving at a decision.

New Debenture Stocks

For the Charing Cross 3¼ per cent. debenture on offer, as mentioned here a fortnight ago, at 100¼, so considerable was the demand that the price has risen to 101¾. Friday in this week is the last day on which the converted stock will pass free of stamp duty. This "converted" stock is entitled to a full six months' dividend of 32s. 6d. per cent. on November 1st next. What is called the "cash" issue of the stock carries a first interest payment of 23s. 10d. per cent. due on the same day. The cash stock is obtainable at 101⅝ free of stamp duty. An issue is being made this week of £1,500,000 3¼ per cent. debenture stock of the North-Eastern Electric Supply Company, offered at 100. The security will rank *pari passu* with the company's present 5 per cent. and 3½ per cent. consolidated debenture stocks.

The French Financial Crisis

The Bank of France, by raising its rate to 6 per cent., has sent a shiver of apprehension down the spine of the Consol Market and of other departments in the Stock Exchange that domicile gilt-edged securities. It is thought that if France were to devalue the franc, towards which step the present attitude of the French Government would seem to be set, this might encourage sales of British gilt-edged securities by French holders. The price of the War Loan gave way sharply, taking with it the quotations for most of the other gilt-edged issues. The stocks of the various Electricity Boards have suffered hardly at all. London Passenger Transport prior charges are disposed to be better.

Electricity Supply Shares

Lancashire Light & Power ordinary have improved 1s. 6d. upon the company's proposal to increase the capital by the creation of 400,000 ordinary shares of £1 each. The company has powers to supply an area of 1,200 square miles in Lancashire. The undertaking cannot be compulsorily purchased by local authorities as a whole, though certain portions are liable to be dealt with in this way. Midland Counties at 37s. 6d. have gone back 6d., but a gain of this amount is seen in Midland Electric Power Distribution shares at 40s. North Metropolitan Electric ordinary have eased off to 61s. 3d., County of London ordinary to 57s. Northamptons are unaffected by the forthcoming offer that is to be made to holders of the company's £1 ordinary shares. This offer provides one new share of 44s. for every five old shares held. The price of the old is 55s. 9d. middle. A sharp fall took place in Whitehall Electric 7½ per cent. preference, the price going back 3s. to 24s. 6d. upon publication of the annual report to March 31st last, which showed a substantial shrinkage in the net revenue for the year ended March 31st, 1935.

Manufacturing and Equipment Companies

Chloride Electrical Storage continue to be an outstanding feature of strength. A fortnight back the prices of the "A" and "B" were both 60s. Last week they rose to 66s. 3d., and to-day stand at 69s. 6d., ex the dividend, whose announcement has been the cause of this substantial rise. Ericsson Telephones, which also spurted a week ago, hold their gain at 6 3/16. There was a sharp rise in Crompton Parkinson ordinary to 48s. 9d. General Electric ordinary at 56s. 3d. are 2s. 6d. up. The G.E.C. dividend is now said to be coming on June 13th. A dividend of 10 p.c. is expected, plus a bonus. Johnson & Phillips have put on 1s. 9d. at 36s. 3d. Enfields are ½ up at £5. British Insulated, at 4 1/16, show a gain of the fraction. English Electric ordinary and preference are both better on the week. Aron Electricity put on 1/16 at 67s. 6d. The company has increased its dividend by 5 per cent., and is about to pay 15 per cent. for the year ending March last, comparing with 10 per cent. in the previous twelve months. There is a little more doing in the television shares, Bairds being a fairly active market. Siemens are better on the speech of the chairman at the meeting on Monday in this week. Business in every section of the company's field has shown, according to the chairman, considerable expansion. Associated Equipments have risen to 39s. Telephone Rentals at 9s. 6d. are ex dividend. Telephone Manufacturing sagged to 6s. 7½d.

American Perplexities

President Roosevelt and his legislature are definitely at daggers drawn over the National Recovery Acts. The evidence of such cleavage was made the reason, or the excuse, for a heavy drive at American stocks, utility and others. Brazilian Tractions, on the other hand, have gone up ⅝ to 10½. Mexican Light and Power first are 3 points higher. In consequence of the alarms and excursions abroad, capital is going freely into British industrials. The iron and steel market is extraordinarily busy. Prices keep hard, with occasional reactions when profit-taking sets in. A further improvement in the price of raw rubber is reflected in a hardening of rubber share values.

Share List of Electrical Companies

HOME ELECTRICITY COMPANIES.

	Nom.	Dividend 1933.	Dividend 1934.	Price. May 28.	Rise or Fall.	Yield p.c. £ s d.
Bournemouth and Poole	1	15	15	76/3	—	3 18 9
Brompton Ordinary	1	7	7	33/6	—	4 3 7
Charing Cross Ordinary	1	7	7	33/9	—	4 3 0
Chelsea	1	7	7	33/6	—	4 3 7
City of London	1	7½	7½	36/–	—	4 3 4
Clyde Valley	1	7	8	42/6	—	3 15 2
County of London	1	10½	10½	57/–	–6d.	3 13 8
Edmundson's 7% Pref.	1	7	7	35/6	—	3 19 0
Elec. Dis. Yorkshire	1	9	9	48/–	—	3 15 0
Elec. Supply Corporation	1	11	11	3 3/16	—	3 11 10
Kensington Ordinary	1	7	7	33/6	—	4 3 7
Lancs Light and Power	1	7½	7½	39/6	+1/6	3 16 0
London Electric	1	7	8	37/6	—	3 14 8
Metropolitan	1	10	10	53/–	–6d.	3 15 6
Midland Counties	1	7	7	37/6	–6d.	3 14 8
Mid. Elec. Power	1	8	8	40/–	+6d.	4 0 0
North Eastern Electric Ordinary	1	6	6	34/–	—	3 10 8
Do. 7% Pref.	1	7	7	35/6	+5d.	3 19 0
Northampton	1	10	10	55/9	—	3 11 9
Notting Hill 6% Pref.	10	6	6	14½	—	4 2 9
North Met. Elec. Ordinary	1	10	10	61/3	–9d.	3 5 6
Do. do. 6% Pref.	1	6	6	31/6	—	3 16 2
St. James and Pall Mall	1	7	8¼	33/6	—	4 18 6
Scottish Power	1	8	8	41/9	—	3 16 8
South London	1	7	7	35/–	—	4 0 0
Westminster Ordinary	1	7	7	33/6	—	4 3 7
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	24/6	–3/–	6 2 5
Yorkshire Elec.	1	8	8	44/6	—	3 12 0

PUBLIC BOARDS.

Central Electricity, 1950–70	Stock	5	5	116	—	4 6 2
Do. 1955–75	,,	5	5	118	—	4 4 9
Do. 1951–73	,,	4½	4½	111½	+½	4 0 6
Do. 1963–93	,,	—	3½	100	—	3 10 0
London & Home Counties, 1955–75	,,	4½	4½	114	—	3 19 0
London Passenger Transport, A	,,	—	4½	125½	—	3 11 9
Do. do. B	,,	—	5	129½	+1	3 17 3
Do. do. C	,,	3	—	100	—	3 0 0
West Midlands Joint Elec. 1948–68	,,	—	5	115	—	4 7 0

TELEGRAPH AND TELEPHONE.

American Tel. & Tel.	$100	9	9	121½	+2	7 8 0
Anglo-Am. Tel. Pref.	Stock	6	6	116½	—	5 3 0
Do. Def.	,,	1½	1½	27	—	5 11 1
Cable & Wireless 5½% Pref.	,,	2¾	4½	79	+8	4 5 3
Do. A. 7½% Ord.	,,	Nil	Nil	24	+4½	—
Do. B Ord.	,,	Nil	Nil	7½	+1½	—
Globe Tel. & Tel. Ord.	10	2½	3½	14½	+½	2 8 3
Do. do. Pref.	10	6	6	14¾	+¾	4 1 4
Great Northern Tel.	10	20	20	41½	+1½	4 16 5
Marconi-Marine	1	10	7½	32/6	—	4 12 4
Oriental Telephone Ord.	1	12	12	3 3/16	—	*3 12 5

HOME AND FOREIGN TRAMS, ETC.

Anglo-Arg. Trams First Pref.	5	Nil	Nil	2/–	—	—
Do. do. 2nd Pref.	5	Nil	Nil	1/6	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	5	—	—
British Electric Traction Df. Ord.	,,	5	5	975xd	—	—
Do. do. Pref. Ord.	,,	8	8	173½	+2	4 12 2
Brazil Traction	100	—	—	10½	+⅝	—
Brit. Columbia Elec. Rly. Pfd.	Stock	5	5	92½	—	5 8 1
Mexican Light Common	100	Nil	Nil	4	—	—
Do. 7% Pref.	100	7	7	5½	—	—
Do. 1st Bonds	$500	5	5	42½	+3	—
Victoria Falls Ord.	1	15	20	7⅝	—	2 14 6
Yorkshire (West Riding)	1	5	6½	32/6	+6d.	4 0 0

MANUFACTURING COMPANIES.

Aron Electricity Ord.	1	10	15	67/6	+ 1/16	4 9 0
Assoc. Elec. Ord.	1	4	6	28/6	+6d.	4 4 3
Do. Prf.	1	8	8	37/–	—	4 6 4
Babcock & Wilcox	1	6	8	44/–	+6d.	3 12 9
British Aluminium Ord.	1	5	7½	37/–	—	4 1 2
British Insulated Ord.	1	5	15	4 1/16	+ 1/16	3 14 0
Brush Ord.	Stock	Nil	Nil	37½	—	—
Callender's	1	15	15	3½	—	4 5 9
Do. 6½% Pref.	1	6½	6½	32/6	—	4 0 0
Crompton Parkinson Ord.	5/–	22	12½	2½	+ ⅛	1 2 9
Do. 8% Pref.	1	8	8	36/3	—	4 8 5
Edison Swan 1st Pref.	1	7½	7½	27/6	—	5 9 0
Electric Construction	1	Nil	Nil	19/–	+1/6	—
Enfield Cable Ord.	1	25	25	5	+¼	5 0 0
English Electric	1	Nil	Nil	12/3	+1/6	—
Do. do. Pref.	1	Nil	Nil	18/3	+ 1/16	—
Ever Ready	5/–	35	35	21/9	—	8 1 0
Ferranti Pref.	1	7	7	28/6	—	4 18 3
G.E.C. Pref.	1	6½	6½	35/–xd	+1/9	3 14 4
Do. rd.	1	8	8	56/3	+¼	2 17 2
Henley's	1	30	30	6¾	—	4 9 0
Do. 4½% Pref.	5	4½	4½	5¾	—	3 16 8
India-Rubber Preferred	1	—	5½	1½	—	4 17 9
Johnson & Phillips	1	5	7½	36/3	+1/9	4 2 9
Siemens Ord.	1	6½	4	1¼xd	+6d.	3 11 1
Telegraph Construction	£1	Nil	Nil	1½	—	—

* Dividends are paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1932

21799. "Oil-immersed electrical apparatus." General Electric Co., Ltd., C. C. Garrard and F. J. Keeley. July 26th, 1933. (427877.)

1933

20437. "Electric discharge vessel." Dr. S. Loewe and P. P. Fries. July 20th, 1932. (427718.)

20849. "Composite structural material and shaped articles made therefrom intended more particularly for electrical purposes." Naamlooze Vennootschap Molybdenum Co. and P. Schwarz-Kope. July 22nd, 1932. (427719.)

21332. "Electric power transmissions systems." A. M. Taylor, July 29th, 1933. (Cognate applications, 23806/33, 24877/33, 32824/33, 3049/34, and 21951/34. (427721.)

26525. "Alternating-current phasing device." L. H. Matthews and E. C. M. d'Assis-Fonseca. September 26th, 1933. (427796.)

29627. "Electromagnetic devices for use in weak magnetic fields." Allgemeine Elektricitäts-Ges. January 13th, 1933. (Addition to 363697.) (427745.)

29833. "Radio receivers." E. K. Cole, Ltd., and E. J. Wyborn. October 27th, 1933. (427747.)

29840. "Control systems for electrically driven elevators." Westinghouse Electric & Manufacturing Co. October 29th, 1932. (427748.)

29930. "Remote-control systems for electrically driven apparatus." Etablissements P. Duclos. October 27th, 1932. (427749.)

29943. "Electrically heated kettles, saucepans, and other heating and cooking appliances." A. E. Willis. October 28th, 1933. (427800.)

29983. "High-frequency line, in particular a high-frequency cable with conductors concentrically arranged." Siemens & Halske Akt.-Ges. November 15th, 1932. (427895.)

30161. "Dynamo-electric machines." H. Schlaich. November 7th, 1932. (427801.)

30244. "Manufacture of porous ebonite diaphragms for electric batteries and other purposes." S. J. Clark & Young Accumulator Co. (1929), Ltd. October 31st, 1933. (427807.)

30255. "Incandescent electric lamps of the multi-filament type." J. Ismay & Sons, Ltd., and J. Ismay. October 31st, 1933. (427809.)

30311. "Incandescent electric lamps." Omega Lampworks, Ltd., and G. E. Jones. November 1st, 1933. (427813.)

30413. "Electric fuse-holders and boxes therefor." E. H. Wirth, E. G. Patridge and W. H. Brown. November 2nd, 1933. (427970.)

30625. "Television and the like transmission systems." Electric & Musical Industries, Ltd., and W. S. Percival. November 3rd, 1933. (427901.)

30712. "Vacuum-tube bases and pins therefor." A. W. Miner. November 4th, 1933. (427980.)

31964. "Electric synchronous motors." Ferranti, Ltd., and M. K. Taylor. November 16th, 1933. (427755.)

31997. "Incandescent bodies and methods of making the same for use as filaments of incandescent electric lamps and for other purposes." Y. Sakakura. May 19th, 1933. (427757.)

32521. "Highly sensitive electric relays." Naamlooze Vennootschap Machinerieen-en Apparaten Fabrieken (Meaf). November 21st, 1932. (427758.)

34197. "Electric generators." British Thomson-Houston Co., Ltd. December 8th, 1932. (427823.)

36505. "Gasfilled electric discharge devices particularly for use in relaxation oscillation generators suitable for use in electrical musical instruments, television sets, and for other purposes." Telefunken Ges. für Drahtlose Telegraphie. December 28th, 1932. (427830.)

1934

157. "Vehicle-actuated road-traffic control systems." Siemens & General Electric Railway Signal Co., Ltd., and F. G. Tyack. January 2nd, 1934. (427832.)

1986. "Electric filters and other impedance systems." Naamloose Vennootschap Philips' Gloeilampenfabrieken. January 30th, 1933. (427913.)

1998. "Electric light fittings." General Electric Co., Ltd., and E. L. Randall. January 19th, 1934. (427835.)

3543. "Electric-arc heating torches for welding and other purposes." J. A. Dorrat, A. L. Guest, and Associated Electrical Industries, Ltd. February 2nd, 1934. (427836.)

4216. "Transformer-coupled induction heater." J. K. Delano. February 8th, 1934. (427838.)

4422. "Device for operating automatic telephone dials." A. Verdier. February 10th, 1934. (427839.)

7407. "Telephone systems." Siemens Bros. & Co., Ltd., R. G. Dixon and R. I. H. Clark. March 8th, 1934. (Addition to 372004.) (427841.)

8240. "Gas-discharge lamps for television and the like." W. J. Nobbs and E. E. Flaig. March 15th, 1934. (427842.)

11290. "Sparking-plug insulators and processes for making the same." R. Bosch Akt.-Ges. May 15th, 1933. (427997.)

15555. "Methods of feeding arc-welding circuits and apparatus therefor." Soudure Electrique Autogène Soc. Anon. May 24th, 1933. (Cognate application 15556/34.) (427931.)

20882. "Elimination of parasites in reception of radio-electric transmissions." G. de Monge. August 1st, 1933. (427941.)

21383. "Electrolytic cells for the production of aluminium." Montecatini Soc. Generale per L'Industria Mineraria ed Agricola. July 22nd, 1933. (427855.)

22182. "Braun tube." Radioakt-Ges. D. S. Loewe and K. Schlesinger. September 29th, 1933. (Addition to 26800/33.) (Divided out of 26800/33.) (427765.)

22793. "Electric motors for producing vibrations." R. Bloem. April 11th, 1934. (428007.)

22882. "Thermionic-valve caps." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. March 11th, 1934. (427858.)

23926. "Thermally controlled switches for relays, circuit-breakers and the like." Brookhirst Switchgear, Ltd., and J. S. Davies. August 20th, 1934. (428011.)

26688. "Arc-welding systems." British Thomson-Houston Co., Ltd. September 19th, 1933. (427863.)

27202. "Electric stoves." British Thomson-Houston Co., Ltd. September 21st, 1933. (428015.)

29409. "Electric circuit interrupters." Westinghouse Electric & Manufacturing Co. November 11th, 1933. (427866.)

29843. "Electric discharge apparatus." W. Lehmann. November 11th, 1933. (Addition to 404283.) (427867.)

29882. "Apparatus for actuating or controlling electrically operated machines." H. Morris, Ltd., and G. A. Robertson. October 18th, 1934. (Addition to 399223.) (427868.)

31512. "Electric transformers." British Thomson-Houston Co., Ltd. November 2nd, 1933. (427948.)

32582. "Submarine communication cables." Siemens & Halske Akt.-Ges. November 11th, 1933. (427872.)

36434. "Electric oil-blast circuit-breakers." British Thomson-Houston Co., Ltd. December 22nd, 1933. (427876.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from May 22nd:—

Pendulock. No. 557148. Class 6. Electric machines for maintaining moving or revolving mechanism in constant speed relation.—Harland Engineering Co., Ltd., Longcrase, Alloa, Scotland.

Electromatic. No. 559162. Class 6. Electric lifts.—Keighley's (Lifts and Motors), Ltd., 13, Victoria Street, Westminster, S.W.1.

Cavac. No. 558724. Class 8. Electric batteries (not for medical purposes) and parts thereof.—C. A. Vandervell, Ltd., Well Street, Birmingham.

Perliane. No. 558965. Class 50. Plastic compositions of cellulose acetate in sheets and articles made therefrom.—Société des Usines Chimiques Rhone-Poulenc, Paris. (British representatives: Mewburn, Ellis & Co., 70-72, Chancery Lane, W.C.2.)

Holnoblane. No. 559357. Class 50. Translucent colour screens made of cellulose and gelatine for use in lighting.—Holophane, Ltd., Elverton Street, Westminster, S.W.1.

German Electrical Progress

AFTER an interval of three years a new volume of the well-known *V.D.E.-Fachberichte*, constituting in effect a review of German electrical progress, has now appeared.* It contains the text and discussions of forty-four papers presented to the Stuttgart meeting of the Association of German Electrical Engineers last summer, arranged in twelve groups which cover practically every branch of electrical engineering.

Among the subjects of particular interest in view of recent developments of German generating practice and policy, special mention may be made of the following: Generator protection in industrial plants; power station construction and unemployment; the economics of industrial power-and-heating steam plants; and developments in the rapid starting of reserve steam plants. Dr. Krohne's paper on the relative merits of d.c. and three-phase distribution, with special reference to the economic aspect and the provision of employment, led to a discussion in which most of the speakers approved the use of 380/220 V, three-phase distribution in new installations, but deprecated the cost of change-over in existing systems.

Other papers of special interest are: Prof. Keinath's report on a new method of direct measurement and recording of dielectric loss in the testing of all kinds of high-voltage apparatus; R. Thoma's report on five years' experience at Aachen with 30,000 automatic circuit-breakers in domestic service; and H. Besold's paper on the selective protection of low-voltage installations by fuses and circuit-breakers. New methods of increasing operating safety in high-voltage switchgear, are dealt with and there is a number of papers on electrical machinery and traction, among which new developments in rail motor car construction, and new electrical transmission systems adapted to the characteristics of Diesel engines receive special attention.

The reports on rectifiers deal particularly with new transformer connections, and with the wave form characteristics and reactions of the apparatus. The papers on communication engineering include a general survey of German equipment for overseas radio communication, and a report by Dr. Banneitz on the present position of television technology. On the industrial side the reports deal with electric heating equipment and its effect on load curves, rectifier control for welders, and the automatic control of extensive conveyor systems.

* *V.D.E.-Fachberichte*, 1934. Pp. 152; figs. 200+coloured plate. Berlin: V.D.E.-Verlag. Price 10.20 marks paper; 13.50 marks bound.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Abram.—Houses (22), Bickershaw; W. H. Roby, surveyor, Council Offices.

Addiscombe.—Houses (56), Shirley Way; Bennett & Worskett, 73, Gower Street, W.C.1.

Aylesbury.—Cinema, Cambridge Street; borough surveyor. Extensions to printing works and institute, for Hazell, Watson & Viney, Ltd.

Ayrshire.—School, Dalleagles (electrical work); W. Reid, county architect, Ayr.

Barnes.—Shops and flats, High Street; E. H. Wale, Ltd.

Beckenham.—Public baths (£37,000); U.D.C. surveyor.

Berkhamsted.—Houses (50), Granville Road, Northchurch, for Mr. Bagley.

Billingham-on-Tees.—Bus station, Portrack Road; U.D.C. surveyor.

Birmingham.—Factory, Hurst Street, for Fisher & Ludlow, Ltd., Rea Street; C. F. Lawley Harrod, architect, 116, Colmore Row.

Blackpool.—Shops, Squires Gate Lane; J. V. Whitehead.

Bournemouth.—Houses and bungalows, Glenroyd Gardens, Castle Lane, Kingshere Avenue, Acton Road, Wallisdown, and elsewhere; borough surveyor. Cinema, Wimborne Road, Winton; William MacKeen. Public baths, Pier Approach; K. M. B. Cross, architect, 46, New Bond Street, London, W. Conference hall, Winter Garden site (£25,000), and secondary school, Charminster; borough engineer.

Bovey Tracey.—R.C. church and presbytery; S. B. Higgott, architect, Midland Bank Chambers, Newton Abbot.

Bradford.—Rebuilding large portion of centre of city; city surveyor.

Brighton.—Houses (68) for aged persons, Manor Farm Estate; Building and Public Works Construction Co., Ltd. Alterations, Palladium Cinema; Odeon Theatres, Ltd.

Bury.—Houses (246), near Radcliffe Road, for A. Aubrey; T. Holmes, builder, The Arcade, 85, Dale Street, Liverpool.

Camborne (CORNWALL).—Cinema, Commercial Square (electrical work); W. H. Watkins, architect, Bristol.

Cambridge.—Houses (20), Scotland Road; town clerk.

Carmarthenshire.—County Offices (£80,000), for C.C.

Cheshire.—County offices and library, Crewe (£30,000), for C.C.

Chichester.—Houses (36), Fishbourne; Housing Committee.

Chipping Norton.—Houses (24), Churchill Road; borough surveyor.

Consett.—Houses (200); T. Hutton, U.D.C. surveyor.

Croydon.—Houses (54), Christian Fields Estate; Chapple Estates, Ltd., Limpsfield Road, Sanderstead. Houses (24), Links View Road; Steel & Son, Farnley Road, S.E.

Dunfermline.—Houses (140); burgh surveyor.

Dunmow.—Houses, Felstead and Hatfield Heath; Messrs. Goodey.

Ealing.—Houses (150), Daryngton Drive, &c.; J. M. Wilson, architect, Station Approach, Hayes. Houses (38), Downing Drive; P. J. Mulcrone, 11, Grove Park, N.W.9. Houses (47), Girton Road; Swannell & Sly, architects. Houses (41), Worcester Gardens; F. W. Field, architect, The Close, Pinner. Factory, Wadsworth Road; Philco Radio & Television Corpn., Ltd.

East Lothian.—Houses (120); F. W. Hardie, county architect, Haddington.

Epsom.—Cinema studio, Worcester Park; L. Norton, architect.

Felling-on-Tyne.—Houses (102), Pelaw; H. Fawcett, architect.

Fenton (STAFFORDSHIRE).—Houses (64), Grove Road; J. B. Thompson.

Flixton.—Houses (48), Cranford Estate; D. Franklyn, builder, 423, Moorside Road. Cinema; Moseley Construction Co., Ltd., builders, Sherbourne Street, Cheetham, Manchester, 8.

Glasgow.—Studios and auxiliary offices, for the British Broadcasting Corporation.

Great Yarmouth.—Council Offices, Hall Plain (£23,000); F. R. B. Haward, and borough engineer.

Hemsworth.—Houses (30), Kirkby Road; U.D.C. surveyor.

Hornchurch.—Houses (24), Glenwood Avenue, for R. M. Smith.

Hoylake.—Houses (50); U.D.C. surveyor.

Hyde.—Houses (150), Woodfield Estate; W. G. West, builder, Highfield Park Estate, Bredbury, Stockport.

Irish Free State.—(TRALEE, Co. KERRY).—Houses (68); O. G. Tough, town surveyor, Tralee.

Isle of Ely.—Extensions, High School, Ely, for E.C.

Kent.—Central and junior schools, Westwood, for County E.C.

Kenton (MIDDLESEX).—Houses, Kenmore Park; L.C.C. architect.

Kidderminster.—Extensions, works, Franchise Street, for Dutfield & Quayle; Lacy Bros., builders, Adam Street.

Knutsford.—Cinema, Toft Road, for Marlcliffe Cinema (Knutsford), Ltd.; C. Ogle, builder, "Porlock," Woodford, Road, Poynton, near Stockport.

Leadgate (Co. DURHAM).—Cinema, Watling Street, for Atkinson & Browell, Garage Plaza Buildings, Consett; J. J. Eltringham, architect, Derwent Street, Blackhill.

Leith.—Flour mills (£70,000) for Scottish Co-operative Wholesale Society; the manager, S.C.W.S., Glasgow.

London.—(BETHNAL GREEN).—Tenements, Dinmont Estate (£31,000); L.C.C. architect. (CHELSEA).—Flats and shops, Manor Street; A. S. Souter, architect. (ST. MARYLEBONE).—Baths, Seymour Place (£149,717); Wm. Moss & Sons, Ltd. Maternity centre, &c., Grove Road (£25,723); Sir Edwin Cooper, architect. (ST. PANCRAS).—Theatre, Tottenham Court Road; Frank Verity and S. Beverley, architects.

Ludlow.—Church, Henley Road, for the Rev. A. H. D'Arcy, St. Peter's Church; B. Treasure & Sons, Ltd., builders, 16, Chester Street, Shrewsbury.

Maldon (ESSEX).—Houses (60); R. T. Clarke, builder.

Manchester.—Houses (200), Moorfield Estate, Two Trees Lane, Denton; W. G. West, builder, Highfield Park Estate, Bredbury, Stockport. Cinema, Hyde Road, Gorton, near Highfield Estate; Circuit Cinemas, Ltd. New wing, Baguley Sanatorium (£50,000); Public Health Committee. Five-years' education scheme (£5,140,698), for City E.C.

Mansfield.—Houses (75), Jenny Beckett's Lane; J. P. Smith, builder, Warwick Drive.

Middlesbrough.—Houses (281); borough engineer. Houses, Benton Avenue and Briardene Avenue; Archibald & Archibald, architects, 26, Albert Road. Houses near Levisk Crescent; Wallis & Arnett, architects, 5, Houndgate, Darlington.

Nantwich.—R.C. church, near Pillory Street; priest-in-charge.

Newbury.—Extensions, works; Elliotts of Newbury, Ltd.

Newcastle-on-Tyne.—Houses (39), Coxon Park Avenue; Marshall & Tweedy, Mervyn House, Pilgrim Street. Church, Heaton; Hicks & Charlewood, architects, 4, Mosley Street. Factory, Churchill Street, for the Northern Beef Co.; S. H. Lawson, architect, Emerson Chambers.

Newport (SHROPSHIRE).—Houses (84), Donnington Wood; J. Hickman, architect.

Northern Ireland.—(DOWNPATRICK).—St. Patrick's Elementary School; McCarthy & Lilburn, quantity surveyors, Scottish Provident Buildings, Belfast.

North Kesteven.—Houses (28); J. Chadwick, R.D.C. surveyor, 25, Clasketgate, Lincoln.

North Riding.—Enlargement, Scalby C.E. School; County E.C.

Penistone (YORKSHIRE).—Houses (88); Pennington, Hustler & Taylor, architects, Pontefract.

Portsmouth.—Houses (308), Wymering Lane, Wymering; and flats, Aylward Street and Bishop Street; city engineer. Wards to accommodate 300 aged persons (£50,000); Public Assistance Committee. Extensions to Cathedral; Walden Bros., builders, Henley-on-Thames.

Preston.—Works, Penwortham, for Courtaulds, Ltd., Foleshill, Coventry; Melville Dundas & Whitson, Ltd., builders, 224, St. Vincent Street, Glasgow.

Prestwick (AYRSHIRE).—Houses (27) and new street; E. Ecrepont, builder, Prestwick.

Radcliffe.—Houses (166), Dumers Lane; S. Mills, clerk to the Council, Town Hall.

Rugby.—Showrooms and offices at the corner of Bilton Road and Lawford Road, for Sam Robbins, Bilton Road; Foster & Dicksee, Ltd., builders, James Street.

Ryde.—Cinema and ballroom; M. E. & O. H. Collins, architects, Old Broad Street, London, E.C.

St. Helens (LANCASHIRE).—Houses (28), Simms Avenue; A. P. Statham, borough engineer.

Scarborough.—Houses (51), for rehousing, Cross Street area; Housing Committee. Elementary school, Northstead Estate, for E.C.

Sedburgh.—Houses (36), Howgill Lane; R.D.C. surveyor.

Shipley (YORKSHIRE).—Houses (24), Fernhill Estate and Moorhead Crescent; C. Houlden. Houses (124) and bungalows, West Royd Estate; H. Dawson, architect, Town Hall.

Southend-on-Sea.—Nurses' home, municipal hospital, with training centre and matron's residence; borough engineer.

Southgate.—Motor showroom, service station, flats, &c., Hoffers Road and Green Lanes, Palmers Green (£60,000); borough surveyor.

Stafford.—Houses (94), Sandon Road; E. H. Appleton, architect, Birmingham Road, Great Barr, near Birmingham. Houses (83), Wolverhampton Road; W. Whittingham, builder, 47, Victoria Street, Wolverhampton.

Stoke-on-Trent.—Houses (28), near Chamberlain Avenue; Leese & Peers. Houses (24), Stone Road, Lightwood; J. E. Simester & Co.

Stone (STAFFORDSHIRE).—Houses (32) and bungalows, Coppice site; U.D.C. surveyor.

Sutton Coldfield.—Houses (20), Halton Road; Alton Estates, Ltd. Houses (47), Lichfield Road; A. J. Leeson & Co. Two schools, Boldmere, Architectural Competition, for E.C.

Tetbury.—Houses (20), Brandon; R.D.C. surveyor.

Thorne.—Elementary school, Thorne, Moorends, for E.C.

Thornton Heath.—Cinema and shops, London Road and Sumner Road; Associated Cinema Properties, Ltd., 31, Golden Square, W.1.

Tottenham.—Sports stadium, Green Lanes, Harringay; borough surveyor.

Truro.—Houses (41), Highertown; Devon & Cornwall Estate Co.

Urmston.—Houses (55), Chassen Lodge Estate; W. Shawcross, builder, Chassen Lodge, Chassen Road, Flixton.

Waddon.—Extension, Factory, Kingsway; C. L. Scott & Co., Ltd.

Wakefield.—Swimming baths, Sun Lane (£35,000); borough surveyor.

West Riding.—School (240 places), Worsborough Dale; director of education, Wakefield.

Weymouth.—Development, Dennis Estate; Andrews & Andrews.

Whitley Bay.—Shops and houses, Seatonsville Road; Dixon & Bell, architects, Pearl Buildings, Northumberland Street, Newcastle-on-Tyne.

Woking.—Houses (44), Westfield; Housing Committee.

Wolverhampton.—Houses (250), Walsall Street; borough surveyor.

Wood Green.—Shops and flats, Gladstone Avenue; Artizans Dwellings Co., Ltd., 1, Cromwell Road, London, S.W.1.

Worcestershire.—School, Lapal, for County E.C.

Worsborough (YORKSHIRE).—Houses; U.D.C. surveyor.

Worsley.—Reconstruction of Co-operative Stores for Walkden Co-operative Society, Ltd., Walkden; Price & Taylor, builders, Back Newcastle Road, Walkden.